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Automotive Daily News

★CARS★ SHOP EQUIPMENT TRUCKS ★★AVIATION★★ PARTS ACCESSORIES ★TIRES★

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EMPLOYMENT IN MOTOR INDUSTRY IN UPWARD SWING

Federal Report Indicates Rise in Next Few Weeks

Special from A. D. N. Washington Bureau

WASHINGTON, Jan. 21.—With most manufacturers finished with the introduction of their 1930 models, employment in the automotive industry within the next thirty to sixty days is expected to take a decided upward swing, it was indicated today on the basis of reports received by the United States Employment Service of the Department of Labor.

While the automotive industry has just passed through its usual winter recessional period, the tire industry appears to be operating on full schedules in anticipation of the heavy demands for its product within the next month.

Rubber plants in Ohio particularly are working on fairly satisfactory schedules and in some instances with extra shifts and forces.

The same situation exists in the steel and iron mills, with operations regarded as satisfactory for this time of the year. Summarized reports from the leading automotive centers of the country follow:—

MICHIGAN

A slight improvement in employment occurred in the last month. Several large factories increased their operating schedules and forces somewhat and a decided increase is expected in the automobile industry in the next thirty or sixty days.

Detroit—A surplus of labor embracing practically all trades was apparent throughout this industrial district.

Pontiac—All plants operated on

(Continued on Page 9)

MICHIGAN A. T. A. HOLDS ANNUAL SESSION TODAY

Special from A. D. N. Detroit Bureau

Detroit, Jan. 21.—The annual convention of the Michigan Automotive Trade Association will be held at Hotel Statler tomorrow, and those who attend will be guests of the Detroit Automobile Dealers' Association at the show in Convention Hall later in the day.

The sessions will open with a business meeting at 11 a. m., followed by an educational session at 1.30 p. m. The annual banquet will be held in the ballroom of Hotel Statler at 6.30 p. m. Homer Guck, former Detroiter and president of the Chicago Herald-Examiner, will be the guest speaker at the banquet, and Henry Montgomery, editor of the Detroit Times, will be master of ceremonies.

The educational program consists of four addresses by national authorities on the topics they will discuss. Henry Kirkland, vice-president of Picard-Sohn, Inc., of New York and Chicago, will open the program with "Tying Up With the Manufacturer's Advertising." Mr. Kirkland is a former Michigan man and for years was associated with Cummings Brothers at Flint. He will be followed by Paul R. Acton of the Weaver Manufacturing Company of Springfield, Ill., whose subject is "The Physical Layout of the Dealer's Place of Business."

James Dalton, industrial editor of Motor, is the third speaker on the program. His topic will be "Better Days Ahead." The last speaker will be M. D. Graham, field secretary of the Michigan Automotive Trade Association, who will discuss "The Dealer's Paramount Problem—Personnel."

TODAY
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DODGE BOOSTS OUTPUT OF 'SIXES' AND 'EIGHTS'

Detroit, Jan. 21.—Dodge Brothers, Inc., have increased January production of the new low-priced six 33 1/3 per cent. Output of the eight-cylinder models has been increased 100 per cent. to maintain its relative proportion to the six-cylinder schedule. Orders placed by dealers at the recent national convention in Detroit absorbed the entire original production volume planned for January. Additional business resulting from the New York Automobile Show necessitated an immediate increase.

CHEVROLET PRODUCING 450 CARS DAILY IN WISCONSIN

Janesville, Wis., Jan. 21.—Although operating no fixed schedule for January, the Chevrolet Motor Company is producing about 450 cars per day, here, officials report. All departments of the plant are in operation and indications are that output will be increased shortly. Employment at the Chevrolet and Fisher plants is about 700 short of the 2,500 peak of last year.

S. A. E. Takes Up Carburetion, Mixture-Distribution, Bearings

Detroit and Flint Zone Chevrolet Dealers Meet

OUTPUT SHOWING SOME INCREASE

Factories Holding to Actual Demand For Cars

By FRED KINGSBURY

DETROIT, Jan. 21. — Production is gradually creeping ahead at the various automobile institutions in the Detroit district, as orders for new units continue to flow in and manufacturers express the opinion that by February 1, heavy output will be the rule at nearly all of the factories.

Executives, returning to Detroit during the past week, called attention to the great interest shown on the part of the public at the various automobile shows in the new cars. They are confident that interest in motor vehicles has grown during the past year, but they are not at all confident as to what extent the public will purchase the offerings.

It is conceded by every one that the 1930 motor cars are better than any of their predecessors, but is the public in a buying mood This is what is troubling the manufacturers. Of, course, they do not believe that production during 1930 will equal that of 1929 and they are determined that there shall be no overproduction if they can help it. For this reason they are not jumping into heavy output this month. They are, of course, furnishing all the cars required and will endeavor to keep from a thirty to sixty day stock ahead and this is a necessity.

Finance organizations, who finance sales of new automobiles, also are keeping a close watch on the buying trend and it is reported they are using more care this year than ever before in financing a car to a retail buyer.

There is no pessimism shown on the part of any one connected with the automotive business in this

(Continued on Page 4)

Special from A. D. N. Detroit Bureau

DETROIT, Jan. 21.—More than 1,200 Chevrolet dealers and star salesmen attended a convention of the Detroit and Flint zones in Detroit yesterday.

The program was presented in the form of a play at the Oriole Theater during the afternoon and a large number of Chevrolet officials took part. There were present 150 star salesmen members of the 100 Car Club and also a number of bankers from the territory.

Last night the dealers and salesmen were guests at a banquet in the Hotel Statler. Program of entertainment was given and addresses were made by several of the Chevrolet officials. The toastmaster was H. J. Klingler, vice-president and general sales manager of Chevrolet.

Among those who spoke were W. S. Knudsen, president and general manager; C. F. Barth, vice-president; J. C. Chick, assistant general sales manager; A. H. Goodman, detroit zone manager; J. D. McLeod, Flint zone manager. They all called attention to the fact that Chevrolet has greatly increased its production schedule for January and that this year will be one of the best in the history of Chevrolet.

Among those seated at the speaker's table were: C. R. Scharff, traffic manager; Harrie Hickey, vice-president and general manager, Argonaut Realty Company; Charles Wetherald, plant manager; C. E. Dawson, national user department, General Motors; F. O. Snell, assistant manager Flint zone; H. T. Ewald, president Campbell-Ewald Company; W. C. Williams, general superintendent, assembly plants; J. M. Crawford, chief engineer; B. G.

(Continued on Page 6)

DES MOINES DEALERS RE-ELECT DEAN SCHOOLER

Des Moines, Ia., Jan. 21.—Dean Schooler was re-elected president of the Des Moines Automobile Dealers' Association at the twenty-first annual meeting of the organization. Roland Manbeck was named vice-president, and J. A. Peverill, Hugh Harter, George Duffield and C. G. Van Vliet were elected directors. George Means is the hold-over member of the board.

FOUNDRY SESSION ALSO SCHEDULED

1,100 Members at Annual Meeting Of Engineers

Special from A. D. N. Detroit Bureau

DETROIT, Jan. 21.—With well over 1,100 members present, the second day's sessions of the four-day annual meeting of the Society of Automotive Engineers got away to an early start at the Book-Cadillac Hotel this morning.

Three technical sessions were on the list today. The morning session was devoted to co-operative research work. W. S. James was chairman. This session was featured by three papers covering a study of the "Properties of Gasoline With Reference to Vapor Lock," prepared by O. C. Bridgeman of the Bureau of Standards, which is reprinted in part in this issue; "The Influence of Atmospheric Conditions on Knock Testing," by D. B. Brooks of the Bureau of Standards, and "The Effect of Design on Engine Acceleration," a paper prepared by Mr. Brooks in collaboration with C. S. Bruce of the Bureau of Standards.

In his paper on vapor lock studies, Mr. Bridgeman subdivided the investigation into three phases: (1) Study of vapor pressures of gasoline as a function of temperature, including effects of dissolved gases and dissolved water. (2) Determination of the conditions under which vapor lock actually occurs in typical fuel feed systems. (3) Measurement of the temperatures existing in representative fuel-feed systems under conditions of operation.

The first phase gave the predicted conditions under which a given fuel theoretically can cause trouble from vapor lock. Data were presented on gas-free vapor pressure of forty-three fuels over a range of temperatures.

The afternoon meeting today was given over to the detonation session and brought out two papers covering studies in this field. Both these papers were published in full in the Automotive Daily News of January 21.

The evening session, devoted to aeronautics, was under the chairmanship of C. B. Fritsche. "Past

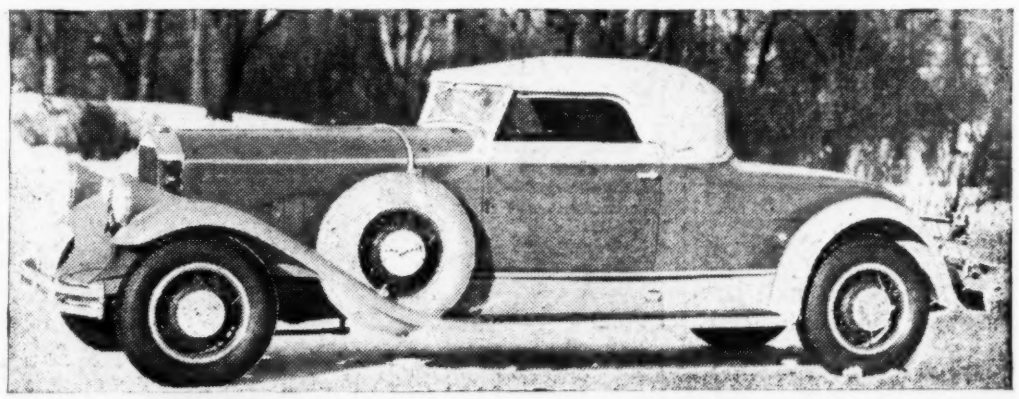
(Continued on Page 9)

MILLER RUBBER APPROVES PURCHASE BY GOODRICH

Akron, Jan. 21.—The Miller Rubber Company board of directors today approved negotiations for the purchase of the company by the B. F. Goodrich Company. Goodrich has already approved the proposition and the deal will be made through exchange of stock, with Goodrich assuming Miller liabilities, it is said, although the basis of purchase was not revealed by either company.

The proposition goes before the stockholders of the Miller company February 17. This purchase will combine two of Akron's older companies, giving Goodrich a much greater diversified line of products and making it the second largest company of its kind, ranking next to Goodyear. Miller preferred stock moved from 18 to 30 in three consecutive days, closing yesterday at 32.

New Pierce-Arrow Convertible Roadster



INTRODUCED AS AN addition to the Pierce-Arrow 1930 Custom De Luxe group of Straight Eight models, the convertible roadster shown above is a two-purpose car, with a Derham body mounted on a 144-inch chassis, and the new Pierce-Arrow Straight Eight engine of 132 horse power. A sloping windshield and side-door panels of glass completely encircled by heavily plated frames are exterior features, while the interior is tailored in rich, hand-buffed leather, with distinctive moldings and fitments

G&O
Radiators
New Haven
AUTOMOTIVE
and
AIRCRAFT PRODUCTS
THE G & O MANUFACTURING CO.,
New Haven, Connecticut

TOLEDO EMPLOYMENT UP

Toledo, O., Jan. 21.—Fifty-one major plants, mainly automotive, reported 24,913 workers in week ended January 17, an increase of 582 over the preceding week and comparing with 43,711 a year ago. This makes a

SIXES DROP AS 8'S GAIN, STUDEBAKER OBSERVES

South Bend, Ind., Jan. 21.—Continued increase in the percentage of eights registered during the first ten months of 1929 has been accompanied by a steady drop in the percentage of sixes in the field above $1,000, a compilation made by the Studebaker Corporation in forty-three states shows. (Only forty-three states give comparative data on registrations.)

Eight registrations increased in all states but Mississippi and showed an average gain of 62 per cent. for the ten months of 1929, compared with the same period of the previous year. Total registrations of sixes for the first ten months of 1929 in the forty-three states amounted to 494,797, compared with 601,961 for 1928. Eights registered increased to 138,015 through October of 1929, as compared with 85,352 for the same period of 1928.

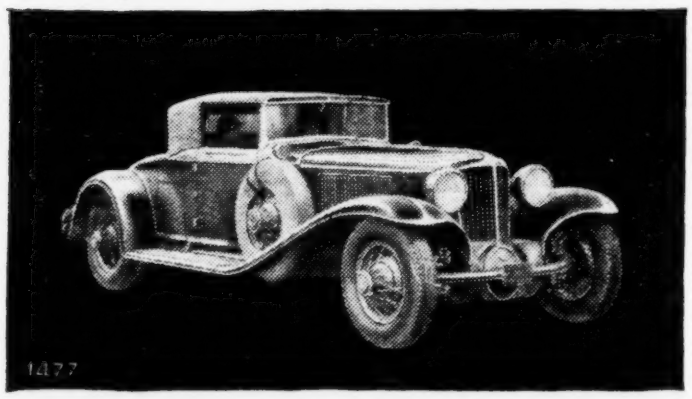
NASHVILLE OPENS SHOW WITH 135 EXHIBITS

Nashville, Tenn., Jan. 21.—The eighteenth annual Nashville Automobile Show opened Monday and continues for five days. The show is at the Hippodrome, Broadway. It is put on by the Nashville Automobile Trade Association, E. Gray Smith, of Packard, president. Upwards of 135 cars and 29 makes are shown.

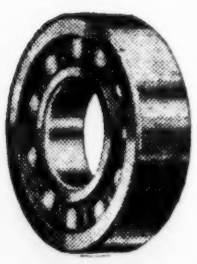
NEW DEPARTURE
BALL BEARINGS

7 in the new Cord

.... The conspicuous success of New Departure Ball Bearings in the Auburn led Auburn engineers to specify their use in the new Cord.



The characteristics of permanent rigidity and longer life assure the utmost in bearing performance. New Departures are used in the differential stub drive shaft, transmission rear end drive shaft, bevel pinion and main shaft front, clutch pilot, generator and fan drive shafts.



The New Departure Manufacturing Company, Bristol, Connecticut; Detroit, Chicago and San Francisco.

NOTHING ROLLS LIKE A BALL

CAR SALES AT NEWARK SHOW SET NEW RECORD; 100,000 IN ATTENDANCE

Newark, N. J., Jan. 21.—Estimates of an attendance slightly under 100,000 for the six days of the twenty-third annual automobile show, which closed Saturday, were made today by William L. Mallon, president of the Newark Auto Trade Association, and Claude E. Holgate, show manager.

More cars were sold during the week than ever before at any show in Newark. The dealers all reported, too, that they had received many requests for demonstrations this week. "Records of all kinds were shattered by the 1930 show," declared Manager Holgate.

President Mallon said: "It is significant that this year, so soon after the sensational stock market crash, more interest is being shown by the public in automobiles than in any year in the past. The great number of cars sold for immediate delivery shows that there is no doubt in the minds of buyers about the security and permanence of American prosperity."

The sale of thirteen Peerless cars was reported by J. W. Mason at the Peerless booth. Three times as many Durant sales as at the 1929 show was reported by M. Stadfeld, president of the United States Motor Sales Company. Gayle Chandler, director of De Soto sales, reported the sale of seven "eights" on the floor at the show. Two and one-half times as many cars, sixes and eights, were sold, he said, as at last year's show. He added that he had arranged to give demonstrations to more than 400 additional prospects. Albert De Cozen, Chrysler distributor, said: "We have made contact with more prospects than at any previous show. Our sales this year, we believe, will be unprecedented."

FITZJOHN CO. REPORTS 1929 SALES UP 17%

Muskegon, Mich., Jan. 21.—The FitzJohn Manufacturing Company reports an increase in sales of approximately 17 per cent. in 1929 over 1928, one of the largest years in volume of business in the history of the company.

Anticipating a further increase in 1930, the company has completed an addition to its motor coach body plant of approximately 18,000 square feet, bringing the total area for operating purposes to about 74,000 square feet.

PENNSYLVANIA LICENSE FEES REACH $28,660,314

Philadelphia, Jan. 21.—Of the total of $29,160,690 collected by the State Bureau of Motor Vehicles during 1929 from the motor vehicle owners of Pennsylvania, $28,660,314 was collected in registration fees. More than one-fourth of the collections came from Philadelphia and Allegheny counties. Philadelphia led with 243,058 passenger cars registered, and it had 38,486 commercial cars; 343,340 qualified drivers, 2,180 motorcycles, 1,384 motor buses and 309,303 miscellaneous registrations. The automobile owners alone paid in fees for their car licenses $2,400,763.

SPARKS from DETROIT

Convention and Show Week

* * *

Klingler on Exports

* * *

New Record for De Roy

Fred Kingsbury—Detroit Editor

THIS is a very busy week for automobile men in Detroit and vicinity and for thousands of others, identified with the industry, who have come to this city to attend the Detroit Automobile Show, the annual sessions of the Society of Automotive Engineers or the convention of the Michigan Automotive Trade Association.

Events have been arranged that will take up almost every minute of the time during the next six days, and hotels are crowded with visitors. Practically all of the automobile factory officials in Michigan will be seen at the various sessions of the bodies above mentioned.

The automobile show opened in Convention Hall Saturday night and will continue for one week. Detroit's new mayor, Charles Bowles, officially opened the exposition, which, automobile men say, fully equals or surpasses any like event ever held in the Motor City. Many thousands of square feet of floor space have been utilized to show the latest in Motordom.

The Society of Automotive Engineers, which has established headquarters in the Book-Cadillac Hotel, opened its sessions Monday afternoon and these will continue through Friday, winding up with a party at the Oriole Terrace, as has always been the custom.

On Wednesday the Michigan Automotive Trade Association will hold sessions all day, ending with a banquet at Hotel Statler in the evening. There are many important questions which the members of the association are anxious to discuss and they will take this opportunity to do so.

* * *

H. J. KLINGLER, vice-president and general sales manager of the Chevrolet Motor Company, is optimistic regarding export business, as far as the automobile industry of the United States is concerned. He feels confident that, in the near future, car makers of the United States will be exporting approximately a million motor vehicles. He says that 80 per cent. of the motor vehicles are now owned in the United States and does not believe that this proportion can be maintained for any great length of time, taking into consideration the population of the world and the great many people who live outside the United States and whose desire is to own a motor vehicle.

* * *

Aaron De Roy, Hudson-Essex distributor in this city, has just set up a new record. He now has more than twenty branches and dealers as members of his organization and last year delivered more than 14,000 automobiles in Wayne county, of which Detroit is the county seat. Mr. De Roy is entering his twentieth active year of retail automobile selling.

* * *

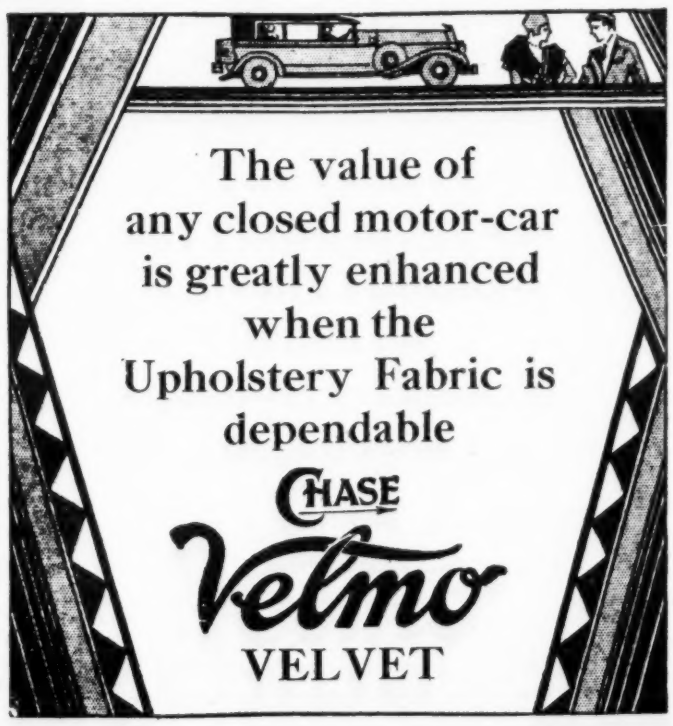
THOSE who do not believe that spring will soon be with us should stop and consider the announcement from the Indianapolis Motor Speedway that tickets for the next classic, to be held May 30, 1930, have gone on sale. Although they are on sale very early this year, officials in charge expect just as large a last minute rush for tickets as in former years.

* * *

S. R. Thomas, the new chief engineer of the Peerless Motor Car Corporation of Cleveland, made his home in Michigan for a number of years. Few people know that at one time he was a professor at the University of Michigan, Ann Arbor. We wonder what he likes best, teaching or designing motor cars.

* * *

With five million people employed either directly or indirectly in the automobile industry, automobile manufacturers are looking to the 500,000 motor car salesmen to get out and sell a great number of automobiles during 1930.



CAR, TRUCK AND BUS
FLEET OWNER LIST
For Any Section of the Country
FLEET OWNER LIST CO.
1817 Broadway, N. Y. C.

Wetmore Analyzes 11 Months' Car Sales in 32 Cities

CITES LEADERSHIP OF PACIFIC COAST

Says Larger Cities Affected Most by Stock Trading

By JOHN C. WETMORE

LOS ANGELES, Jan. 21.—With motor car makers slowing down in production and most merchants devoting the two wind-up months of last year to merely cleaning up of 1929 models on hand in preparation for the coming of the cars, November automobile sales were expected, of course, to show a drastic drop from those of October and a big falling off from those made in that month of 1928.

These expectations were fulfilled. New passenger car registrations fell off 21.2 per cent. from those of October in thirty-two representative cities, and of 3 per cent. in the four key cities of Los Angeles, New York, Chicago and Detroit.

The turn of the high tide of 1929, which began in October with a loss of 1.5 per cent. in the thirty-two cities and of 3.0 per cent. in the four key cities, as compared with 1928, was increased to 20.4 per cent. and 23.3 per cent. respectively in November in these two groups.

The November loss fell heaviest on the big trade centers, due, perhaps, to their denizens being more involved in the October-November stock market losses than their smaller town brothers, as will be seen in the accompanying table. It will also be seen from this table that automobile merchants in the larger population centers, due, perhaps to bigger Wall Street winnings earlier in the year, made larger "to date" gains over those of the first eleven months than did the smaller cities.

Incidentally, I was a bit curious to compare losses of some of the popular medium and high priced makes, which theorists thought would be most affected by the stock market slump, and found that at least four of the latter—Packard, Cadillac, La Salle and Studebaker—in the aggregate got by in the four key cities with only a 20 per cent. loss, as compared with an all-around drop of all makes of 23.3 per cent. in those cities.

While all of the thirty-two cities made gains in the first eleven months of 1929, only Seattle and Rochester showed November increases over 1928. Incidentally, so far as the cities included in the table are concerned, Seattle evolved as the banner city of the nation with the best percentage showing not only in November but for the year to December.

Though other makes than Ford in the four key cities came within 1,204 sales, or three-tenths of 1 per cent. of equaling their eleven months' sales in 1928 (344,546-345,750), they showed a November loss of 28.9 per cent (13,185-18,558).

Despite a loss of 5.2 per cent. in the four key cities in November, Ford accounted for 29.3 per cent. of all sales in that month as compared with 23.7 per cent. in 1928. Ford's eleven months' ration to the total was 28.6 per cent., as against 9.9 per cent. in that period of 1928.

In the four key cities the relative 1929-1928 ratios of Ford and Chevrolet in the aggregate to total sales were 42.1-31.9 per cent. in November and 42.7-20.8 per cent. for the eleven months' period.

All but four of the forty-one makes, whose new passenger car sales in the four key cities follow, showed losses as compared with November 1928, though sixteen of them were able to boast of "to date" gains over the eleven months' period of the preceding year.

	Nov. 1929	Nov. 1928	11 Mos. 1929	11 Mos. 1928
1. Ford	5,484	5,788	138,528	38,071
2. Chevrolet	2,379	1,990	67,754	71,730
3. Buick	1,425	1,567	26,632	29,855
4. Essex	946	1,116	30,125	26,283
5. Nash	768	1,384	20,496	22,218
6. Dodge	732	1,398	11,094	13,762
7. Chrysler	666	1,341	15,292	23,763
8. Packard	544	789	12,161	11,422
9. Hudson	540	398	11,568	7,656
10. Studebaker	505	884	14,360	15,615
11. Pontiac	444	1,375	19,683	19,872
12. Cadillac	444	447	4,969	5,307
13. Oldsmobile	383	445	12,814	8,977
14. De Soto	351	625	8,598	2,384
15. La Salle	326	368	5,175	4,394
16. Graham-Paige	324	656	11,193	12,898
17. Hupmobile	274	307	6,185	7,677
18. Plymouth	210	255	7,163	1,867
19. Durant	210	406	4,435	5,669
20. Whippet	201	541	12,731	12,948
21. Willys-Knight	172	300	6,903	6,622
22. Oakland	169	481	4,633	4,597
23. Pierce-Arrow	128	101	1,859	1,327
24. Auburn	105	105	4,491	3,215
25. Lincoln	96	151	2,162	2,072
26. Reo	90	132	2,695	3,133
27. Peerless	85	39	1,280	1,141
28. Marquette	84	0	1,835	0
29. Franklin	83	80	1,811	1,023
30. Marmon	83	121	1,581	2,940
31. Roosevelt	65	0	2,183	0
32. Cord	51	0	252	0
33. Erskine	43	122	797	2,809
34. Viking	40	0	1,052	0
35. Stutz	29	36	553	651
36. Gardner	28	29	582	636
37. Jordan	28	35	423	779
38. Windsor	20	0	319	0
39. Stearns-Knight	14	43	524	342
40. Chandler	13	128	1,879	2,116
41. Black Hawk	10	0	250	0

In the table below new passenger registrations in fourteen groups are shown. It will be noted that General Motors outsold Ford-Lincoln both in the November and eleven months' periods. Though there was a G. M. loss of 14.6 per cent. in November, its nine new passenger car units came within 172 of equaling its last year's eleven months' sales record. Incidentally, the 1929-1928 General Motors ratios to total sales in the four key cities in these periods were 30.4-27.4 per cent. in November and 29.9-37.7 per cent. "to date," as compared with 29.8-24.3 per cent. and 29.1-10.4 per cent. for Ford-Lincoln, which lost 6 per cent. in November, as against a 250.4 per cent. eleven months' increase.

In an effort to get some idea of the respective November and eleven months' gains and losses in the three leading trade sections of the United States I have attempted to visualize them by the sales records of their leading cities as follows:—

Middle Atlantic States (New York, Philadelphia, Pittsburgh, Buffalo) November, 23.8 per cent. loss, 11,465-15,054; eleven months, 21.1 per cent. gain, 266,789-220,138.

Middle West States (Chicago, Detroit, Cleveland, Cincinnati) November, 24.1 per cent. loss, 8,829-11,639; eleven months 24.7 per cent. gain, 290,802-218,688.

Pacific Coast (Los Angeles, San Francisco, Seattle, Portland) November, 9.9 per cent. loss, 8,703-9,667; eleven months, 37.5 per cent gain, 153,355-113,647.

It will be seen from the above that the best relative sales were made by the Pacific Coast cities with the smallest percentage of loss in November and the largest eleven months percentage increase.

While the Middle Atlantic States aggregation was the best seller in November, the Middle West group was far ahead of the former "to date."

	Nov. 1929	Nov. 1928	11 Mos. 1929	11 Mos. 1928
General Motors	5,694	6,673	144,547	144,729
Ford-Lincoln	5,580	5,939	140,690	40,143
Chrysler Corporation	1,959	3,619	42,147	41,776
Buick-Marquette	1,509	1,567	28,467	29,855
Hudson Company	1,458	1,514	41,693	33,939
Cadillac-La Salle	770	815	8,064	9,793
*Studebaker	676	1,107	17,016	19,751
Oakland-Pontiac	613	1,856	24,316	24,469
Oldsmobile-Viking	423	445	13,866	8,977
Willys-Overland	373	841	19,639	19,570
Hupmobile-Chandler	287	435	8,064	9,793
Auburn-Cord	156	106	4,743	3,215
Marmon-Roosevelt	148	121	3,764	2,940
Stutz-Black Hawk	39	36	803	651

*Including Erskine and Pierce-Arrow.

November, 1929, New Passenger Car Registrations in 32 Representative Cities

Districts	Nov. 1929	Nov. 1928	Nov. % Gain	11 Mos. 1929	11 Mos. 1928	11 Mos. % Gain
1. Los Angeles	6,413	7,084	9.4*	105,083	76,511	37.3
2. N. Y. Met. Dist.	6,371	9,104	30.0*	156,672	141,748	10.2
3. Chicago	3,353	3,514	4.5*	109,945	86,011	27.8
4. Detroit	2,532	4,644	45.5*	111,374	79,551	40.0
Four Key Cities	18,669	24,346	23.3*	483,074	383,821	25.8
Cleveland	2,084	2,209	5.6*	49,608	36,670	35.2
Philadelphia	2,027	2,482	17.1*	41,850	35,198	18.8
Pittsburgh	1,929	1,935	0.5*	38,859	28,995	34.0
St. Louis	1,822	2,572	29.1*	35,139	31,883	9.2
Washington, D. C.	1,251	1,296	3.4*	22,394	17,115	32.6
3 Ohio Cities†	1,157	1,552	34.1*	29,272	22,581	22.8
Buffalo	1,138	1,533	25.7*	29,408	23,784	23.6
San Francisco	1,127	1,448	22.1*	21,975	17,370	26.5
Boston	921	1,054	12.6*	21,988	19,688	11.1
Houston	919	1,036	11.2*	16,270	11,927	36.4
Cincinnatti	860	1,272	32.3*	19,875	16,456	20.7
Providence	793	862	8.0*	16,062	12,662	21.1
Kansas City, Mo.	750	806	6.9*	19,670	15,884	19.2
New Orleans	730	808	9.6*	10,344	8,872	16.5
Indianapolis	665	708	6.0*	18,314	14,684	19.8
Portland, Ore.	601	703	14.5*	11,076	9,057	22.4
Columbus, O.	589	920	35.9*	14,898	11,865	25.5
Syracuse	578	542	6.6	11,330	9,209	23.0
Rochester	560	898	36.9*	15,631	13,185	18.5
Seattle	562	432	30.0	15,599	10,709	45.6
Akron	503	764	21.0*	15,445	11,649	28.7
Louisville	475	657	27.7*	9,554	9,049	5.5
Toledo	416	746	44.2*	12,928	12,059	7.1
Denver	363	619	41.3*	11,906	9,511	25.1
Des Moines	291	343	15.1*	6,981	5,932	17.6
Fargo	89	97	28.8*	2,079	1,798	13.5
28 Other Cities	23,200	28,294	17.0*	518,455	417,792	24.6
Total 32 Cities	41,869	52,640	20.4*	1,001,528	801,613	24.9

*Loss. †Dayton, Canton, Youngstown.

DEALER DOINGS

Boston, Mass., Jan. 21.—As the climax of the biggest year in the sale of used cars the organization has ever had, the Nash New England Company tendered a dinner to the members of the used car sales department at the Hotel Lenox. This marked the end of a sales contest which started last October when two teams, captained by Perry Adams and W. S. McQueston, started to make the year a lively one.

Milwaukee, Wis., Jan. 21.—The newly organized Bay View Chevrolet Company will build a $100,000 garage and building at 1120 Kinnickinnic Ave. V. H. Bosworth is president and T. S. Palmer vice-president.

New Britain, Conn., Jan. 21.—Howard W. Whitmore, for several years past an associate dealer in New Britain, has taken on the Oakland and Pontiac in this territory as an associate dealer of the state distributor, the A. C. Hine Company of Hartford.

Springfield, Mass., Jan. 21.—The Oldsmobile Springfield Company has moved its service station for Oldsmobile and Viking cars from its quarters on South Main Street to 18-22 Sharon St. Oldsmobile display rooms are still at 510 South Main St.

Los Angeles, Jan. 21.—The Auburn-Fuller Company, Auburn and Cord distributor for southern California, has completed a new branch at 208 North Canon Drive. It is under the management of M. R. Sisson.

Andrews, N. C., Jan. 21.—The Andrews Motor Company, local Ford dealership, has been sold by B. Currier to Z. D. Morrow, who comes here from Bryson City, where he has been engaged in the automobile business for many years.

Personal Briefs

Fennimore, Wis., Jan. 21.—V. A. Hetland has purchased the Jefferson Automobile Company at Jefferson and will operate that Ford dealership as well as the one in this city.

Fort Wayne, Ind., Jan. 21.—R. C. Stonebraker, whose company's sales rooms are located at 207 East Superior St., has been named as Fort Wayne distributor for the De Soto Motor Corporation.

Kankakee, Ill., Jan. 21.—Robert McKay, distributor of Willys-Overland cars, has purchased the Arthur E. Gray garage at 143 South Indiana Avenue. He will transfer to his new location as soon as the present tenants vacate. He will conduct a repair and service department and also handle day and night storage. Joseph Beadles has been appointed foreman of the repair shop.

Racine, Wis., Jan. 21.—Bryan Roberts has purchased the interest of his business associate, Howard Peterson, in the Union Chevrolet Company.

Beaver Falls, Pa., Jan. 21.—Charles W. Wagner and Charles W. Kribbs, who have conducted Dodge dealerships here and in Ambridge for about twelve years, have dissolved partnership. Wagner has taken over the Ambridge business and Kribbs will remain in charge here.

Coming Automobile Shows

Albany, N. Y.—Albany Automobile Dealers' Association, State Armory ..... Feb. 8-15
Allentown, Pa.—Lehigh Auto Trade Association ..... Feb. 8-15
Ansonia, Conn.—Ansonia, Derby, Shelton and Seymour Automobile Dealers' Association, State Armory ..... Feb. 13-15
Aurora, Ill.—At Blanchard Calendar Building ..... Feb. 5-9
Baltimore, Md.—At Fifth Regiment Armory ..... Jan. 18-25
Batavia, N. Y.—At Ortner Building ..... Jan. 29-Feb. 1
Boston, Mass.—At Mechanics Building ..... Jan. 18-25
Bristol, Conn.—National Guard, Company L ..... Jan. 30-Feb. 1
Brooklyn, N. Y.—Motor Vehicle Dealers' Association, Twenty-third Regiment Armory ..... Jan. 18-25
Camden, N. J. ..... Feb. 24-March 1
Centralia, Wash.—At Maple Street Auditorium ..... March 7-9
Chicago, Ill.—National Automobile Show ..... Jan. 25-Feb. 1
Cleveland, O.—Cleveland Automobile Manufacturers and Dealers' Association, Public Auditorium ..... Jan. 25-Feb.1
Columbus, O. ..... Jan. 26-Feb. 1
Cumberland, Md. ..... Feb. 3-8
Danville, Ill.—Dealer Display Week ..... Jan. 27-Feb. 1
Dayton, O.—At Delco Building ..... Feb. 2-6
Denver, Col.—At Denver Auditorium ..... Feb. 10-15
Des Moines, Ia. ..... Feb. 24-March 1
Detroit, Mich. ..... Jan. 18-25
Duluth, Minn.—Head of the Lakes Automotive Trade Association, Armory ..... Feb. 17-22
Elkins, W. Va.—At Elkins Garage ..... March 27-29
Enid, Okla.—Farm Machinery and Tractor Show ..... March 12-14
Erie, Pa.—At 12th Street Market Building ..... Jan. 20-25
Evansville, Ind.—Automobile Dealers' Association, Memorial Coliseum, 19th Annual ..... Feb. 25; March 1
Harrisburg, Pa.—Automotive Trade Assoc'n, Chrysler Bldg. Jan. 18-25
Hartford, Conn.—At State Armory ..... Jan. 18-25
Holyoke, Mass. ..... Feb. 20-22
Huntington, W. Va.—At Vanity Fair Building ..... Jan. 20-25
Indianapolis, Ind. ..... Feb. 10-15
Jacksonville, Ill. ..... Feb. 8-15
Jersey City, N. J.—Hudson County Automobile Dealers, Armory Auto Salon ..... Jan. 27-Feb. 4
Kansas City, Mo.—At American Royal Building ..... Feb. 8-15
Lawrence, Mass. ..... Jan. 29-Feb. 1
Los Angeles, Cal.—Los Angeles Motor Car Dealers' Association, Feb. 22-March 2
Louisville, Ky. ..... Jan. 18-25
Mankato, Minn. ..... Feb. 12-15
Minneapolis-St. Paul, Minn.—Northwest Automobile Show, Livestock Pavilion, Hamline ..... Feb. 1-8
Montreal, Can.—National Eastern Canadian Motor Show, Stadium, Jan. 18-25
Montreal, Can.—Garage and Shop Equipment Show ..... Jan. 20-24
Muncie, Ind.—At North Walnut Street Field House ..... Mar. 20-22
Nashville, Tenn.—At Hippodrome ..... Jan. 20-25
New Brunswick, N. J.—Automobile Dealers' Association, Sisser Building ..... Jan. 20-25
New Haven, Conn. ..... Jan. 29-Feb. 1
Nice, France ..... March 16-30
Omaha, Neb.—Automobile Trade Association, Ak-Sar-Ben Coliseum, Feb. 17-22
Ottawa, Can. ..... Feb. 3-8
Paterson, N. J.—At Armory ..... Jan. 20-27
Peoria, Ill.—Automotive Dealers Association, Armory ..... Feb. 12-16
Pittsburgh, Pa.—At Motor Square Garden ..... Jan. 18-25
Portland, Me.—At Exposition Building ..... Jan. 27-Feb. 1
Providence, R. I.—At Cranston Street Armory ..... Feb. 15-22
Rochester, N. Y. ..... Jan. 20-25
Rock Island, Ill.—At Boone Building ..... Feb. 12-15
St. Paul-Minneapolis, Minn.—Livestock Pavilion, Hamline ..... Feb. 1-8
St. Petersburg, Fla. ..... Jan. 20-23
St. Louis, Mo. ..... Feb. 4-9
San Francisco, Cal.—Pacific Show, Civic Auditorium ..... Feb. 1-8
Scranton, Pa. ..... Feb. 3-8
Seattle, Wash.—Automobile Show and Transportation Pageant, Civic Auditorium ..... Feb. 25-March 2
Sheboygan, Wis. ..... Feb. 10-16
South Bend, Ind.—At Grenada Theater Building ..... Feb. 4-8
Spartanburg, S. C. ..... Feb. 11-13
Springfield, Ill. ..... Feb. 13-15
Springfield, Mass. ..... Jan. 20-25
Syracuse, N. Y.—At Armory ..... Feb. 3-8
Tacoma, Wash—Automobile Dealers' Association, Pierce County Airport ..... Feb 11-16
Toledo, O.—At Exhibition Hall and Auditorium ..... Feb. 3-8
Washington, D. C.—At Auditorium ..... Jan. 25-Feb. 1

Automotive Daily News

"Of, By and For the Entire Automotive Industry"

AUTOMOTIVE DAILY NEWS PUBLISHING CORPORATION,
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The Dealer's Year

AUTOMOTIVE DAILY NEWS has many times called the attention of its automobile dealer readers to the fact that 1930 is going to be their year. Every tendency in recent developments points to fewer problems and greater profits for the dealers during the coming twelve months.

The most important factor in the situation is the better understanding that exists today between manufacturers and dealers. They are closer together today than they ever have been. Price increases have been general throughout the industry, giving dealers that small margin of added profit that obviates uneconomic methods of dealing particularly in used cars. It is wholly probable that dealers generally will sell fewer new cars in 1930 than they did in 1929, but the profit per unit will be greater and the number of used cars that will have to be handled to get the final net on any sale will be lessened.

Furthermore, the year 1930 will undoubtedly be a very profitable one in the service field. With the number of new cars reduced, there will be more jobs brought into the service department.

By the same token sales in accessory and replacement parts departments are going to be greater than they were in 1929. Every dealer has the chance this year of establishing his subsidiary business activities on a firm basis.

To realize the full measure of the opportunities that 1930 offers, the dealer must get firmly in his mind the idea that he is in the business of supplying transportation and not merely of selling new cars or trucks. Automobile dealers, more than almost any other class of merchants, have the chance to practice diversity of offerings and all within their own rightful field. The drug store to get diversity had to step into totally unrelated lines—sandwiches, books, cigarettes and what not. The automobile dealer has a dozen openings for diversifying his offerings, and yet all of them lie within his rightful sphere of transportation.

President Rutherford of the Pennsylvania Rubber organization not long ago remarked that this was the best possible time to persuade the automobile dealer to handle tires. It is. The dealer whose obvious business is the merchandising of a line of new cars has the chance of making a profitable sideline out of tires, accessories, battery service, painting, gasoline and oil sales, the obvious service and replacement parts business, which he has got to handle simply to keep his customers' transportation in operation.

Automobile dealers have tried handling various other lines not directly related to transportation, and the experiment has not been strikingly successful. A good many dealers have taken on radio, and here the connection is much closer. Radio after all is transportation. It is voice transportation, and furthermore radio is rapidly becoming a common equipment item on motor cars.

It may quite well be that the automobile dealer is the one merchant better adapted than any other to handling radio, and that the retail business in this field is going to come into his hands.

From our present vantage point it looks as if the year 1930 was going to be the best dealer year in history. Dealers are going to make a better profit on the sale of new cars. The used car problem is not going to be as pressing as it has been. This condition gives the dealer a chance to develop diversity within the sphere of his legitimate activity, which is transportation. The automobile merchant who does not use this opportunity to develop his service, replacement parts, accessory, tire and other obvious sidelines is letting slip a real chance. In many cases the automobile merchant will find that he can branch out into other allied lines of endeavor and do it profitably, such as battery service, a painting department, radio and other divisions. Local conditions will indicate the wisdom of some of these diversifications of the obvious business. And 1930 is the time to do it.

Here and There in the Trade Headlines— By MacConachie

CALL ME 5 MINUTES BEFORE THE CHICAGO CURTAIN
CATCHING UP ON THE HAY QUOTA.
SHOW SALESMAN
"8" CYLINDERS.
FRONT WHEEL DRIVE.
NO WILD COLORS.
GMAC '30
THREE OF THE "BIGGER'UN BETTER THAN EVER" SHOW FEATURES.
HOW THE OLD BUS LOOKED TO MAMMA, AFTER THE SHOW

CALENDAR OF COMING EVENTS

JANUARY

18-25—**Baltimore, Md.** Automobile show.
18-25—**Brooklyn, N. Y.** Motor Vehicle Dealers' Association Automobile Show.
18-25—**Boston Mass.** Annual Automobile Show.
18-25—**Detroit, Mich.** Automobile Show.
18-25—**Harrisburg, Pa.** Annual Automobile Show of the Harrisburg Automotive Trade Association.
18-25—**Hartford, Conn.** Automobile show.
18-25—**Louisville, Ky.** Automobile show.
18-25—**Montreal, Canada.** Automobile Trade Association National Eastern Canadian Motor Show.
18-25—**Pittsburgh, Pa.** Automobile show at Motor Square Garden.
20-23—**St. Petersburg, Fla.** Automobile Show.
20-24—**Montreal, Can.** Garage and shop equipment show.
20-25—**Wilkes-Barre, Pa.** Automobile Show.
20-25—**Huntington, W. Va.** Automobile Show.
20-25—**Nashville, Tenn.** Automobile show at Hippodrome.
20-25—**Rochester, N. Y.** Automobile show
20-25—**Springfield, Mass.** Automobile show
20-25—**Erie, Pa.** Automobile Show.
20-25—**New Brunswick, N. J.** Automobile Dealers Association Show at Sesser Building.
20-25—**Wilmington, Del.** Automobile Show.
20-27—**Paterson, N. J.** Automobile Show.
21-24—**Detroit, Mich.** Society of Automotive Engineers' Annual Meeting.
25-Feb. 1—**Chicago.** National Automobile show.
25-Feb. 1—**Washington, D. C.** Automobile Show.
25-Feb. 1—**Cleveland, O.** Show at Public Auditorium, auspices of Cleveland Automobile Manufacturers and Dealers' Association
25-Feb. 1—**York, Pa.**—Automobile Show at Shipley Garage.
26-Feb. 1—**Columbus, O.** Automobile Show.
27-28—**Chicago.** National Automobile Dealers' Association Convention.
27-Feb. 1—**Portland, Me.** Automobile Show.
27-Feb. 1—**Danville, Ill.** Dealer Display Week.
27-Feb. 4—**Jersey City, N. J.** Hudson County Automobile Dealers' Show.
29-Feb. 1—**Batavia, N. Y.** Automobile Show
29-31—**Cleveland, O.** Ohio Association of Commercial Haulers' Convention.
29-Feb. 1—**New Haven, Conn.** Automobile show.
29-Feb. 1.—**Lawrence, Mass.** Automobile Show.
30-Feb. 1—**Bristol, Conn.** National Guard, Company L. Automobile Show.

FEBRUARY

1- 8—**Minneapolis-St. Paul.** Automobile show.
1- 8—**San Francisco.** Pacific Automobile show at Civic Auditorium.
2- 6—**Dayton, O.** Automobile Show.
3- 8—**Cumberland, Md.** Automobile show.
3- 8—**Ottawa, Canada.** Motor show.
3- 8—**Scranton, Pa.** Automobile show.
3- 8—**Syracuse, N. Y.** Automobile Show
3- 8—**Toledo, O.** Automobile show.
3- 8—**Wichita, Kan.** Automobile show.
4—**Minneapolis, Minn.** Motor Trades Association, annual meeting at Hotel Badesson.
4- 8—**South Bend, Ind.** Automobile Show.
4- 8—**St. Louis, Mo.** Automobile Show.
5- 8—**Elgin, Ill.** Automobile Show.
5- 8—**East Liverpool, O.** Automobile Show.
5- 9—**Aurora, Ill.** Automobile Show.
7- 9—**Centralia, Wash.** Automobile Show.
8-15—**Albany, N. Y.** Automobile show at State Armory.
8-15—**Los Angeles, Cal.** Automobile Salon
8-15—**Kansas City, Mo.** Automobile show.
8-15—**Allentown, Pa.** Lehigh Auto Trade Association Automobile Show
8-15—**Jacksonville, Ill.** Automobile Show.
10-15—**Indianapolis.** Automobile show.
10-15—**Denver, Col.** Automobile show.
10-16—**Sheboygan, Wis** Automobile Show.
11-13—**Spartanburg, S. C.** Automobile Show
11-16—**Tacoma, Wash.** Automobile Show at Pierce County Airport.
12-15—**Rock Island, Ill.** Automobile Show.
12-15—**Mankato, Minn.** Automobile Show
12-16—**Peoria, Ill.** Automobile Show at Armory
13-15—**Springfield, Ill.** Automobile Show
13-15—**Ansonia, Conn.** Automobile Show
15-22—**Indianapolis.** Automobile Show.

GRIMM ELECTED HEAD OF ALCOHOL INSTITUTE

New York, Jan. 21.—Officers of the Industrial Alcohol Institute, Inc., elected at the annual meeting are: President, Richard H. Grimm, president of the American Commercial Alcohol Corporation; first vice-president, S. S. Neuman, Publicker Commercial Alcohol Company, Philadelphia; second vice-president, A. K. Hamilton, Pennsylvania Sugar Company, alcohol division, New York city; treasurer, H. I. Peffer, president American Solvents and Chemical Corporation, New York city.

Dr. Lewis H. Marks, also of New York, was re-elected executive secretary.

N. J. SUPREME COURT RULES AGAINST INSURANCE FIRM

Newark, N. J., Jan. 21.—Insurance companies are liable for damage caused by automobiles insured by them, even though the assured fails to give notice of an accident, according to a decision of Judge Worrall F. Mountain in Supreme Court, Essex County circuit. The case involved injury to two persons in a collision of their automobile with a taxicab of the Globe Taxi Company insured by the Jersey Mutual Casualty Insurance Company, Newark. The insurance company refused to defend the suit on the ground that the taxi company had failed to give notice of the accident.

JAEGER MACHINE REPORTS INCREASE IN EARNINGS

Chicago, Jan. 21.—The Jaeger Machine Company reports for the year ended November 30, 1929, net profit of $527,601 after charges and Federal taxes, equivalent to $3.39 a share on 155,626 no par shares of stock. This compares with a net profit in the preceding year of $404,734 or $4.04 a share on 100,000 shares then outstanding.

CAR PRODUCTION ON THE UPWARD GRADE

(Continued from Page 1)

section of the country. Optimism prevails, but there is no "Whoop hurrah, let's go get 'em" attitude being displayed. They are all down to solid business and working hard to sell motor vehicles.

Executives frankly say that those dealers who have built up good sales organizations and who go out and work hard are the ones who will show a measure of profit during the next twelve months.

We must admit there are a considerable number of dissatisfied dealers, but this number is not believed to be any greater than in other lines of business.

There are plenty of used cars to be had, but surveys would seem to indicate that the ratio of used cars to the number of owners of motor vehicles is not much greater than it was a year ago this time. Used car buyers have not been coming into the market in any great numbers as yet, and they probably will not begin to for another month, if past performances can be depended upon.

Taken all in all, the automobile business is in good shape, and the past week has registered a gain in business.

CAPITOL CHEVROLET OPENS

Beaver Falls, Pa., Jan. 21.—The Capitol Chevrolet Company has opened for business at 1902 7th Ave. The proprietors are R. A. Sheriff and C. G. Hershberger. The New Brighton branch of the company is continued.

Better Road Maps

The New 1930 Idea Vacation Tours for Motorists

A 32-page colorful and descriptive auto road atlas, specially designed for vacation motoring. Shows 14 carefully planned motor tours and maps covering the Eastern United States and parts of Canada. Information includes places of scenic beauty, historic and educational interest, suggested overnight stops, road and traffic conditions, etc. Recreation is the main consideration of Vacation Tours for Motorists.

Automobile Dealers

Give your customers this superior road atlas with your advertisement on front and back cover. They will appreciate it. (Carries no other advertising). 500 copies with your "ad," $80. Lower prices on larger quantities. For price quotations and descriptive circular, write

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TAKING ON NEW LINES IN MASS.

Jobbers Expanding in Anticipation of 1930 Boom

SPRINGFIELD, Mass., Jan. 21.—Considerable activity is shown in the automotive parts jobbing field in western Massachusetts, with jobbers adding new lines and expanding in anticipation of a prosperous year.

Business in December, while not as good as in the same month last year, was better than had been anticipated. Continued cold weather, with snow and sleet, boosted sales of skid chains, anti-freeze compounds, heaters and shutters.

The Nagel Battery and Electric Company, Springfield, has moved its stock and equipment to its new sales and service building, Memorial Avenue and Main Street, West Springfield, where it has more space at less cost.

Mays Auto Parts, Inc., Pittsfield, has added the Tropic Aire Heater line, while the Jack Mulcare Motor Supply Company, also of Pittsfield, has added Bond batteries and flashlights. Raybestos hose, fan belts and rivets and Champion spark plugs.

In Worcester the Automotive Jobbing House has taken on the Glode storage batteries, while Leavitt Brothers report Goodyear tire chains and Rotary lifts as their new lines.

New lines added by the Standard Electric Company, New Bedford, include electric spray guns, Schrader tire valves, Republic gears, Perfect Circle rings, Everready Prestone and Goodyear rubber chains. Kempton Electric Service, New Bedford, announces Wahl shock absorbers and heaters and B-K brakes as new lines.

Lowell jobbers adding new lines are: Markus-Bradford, Inc., National jacks, Kuprox chargers and Splitdorf and Robert Bosch ignition parts; F. X. Horan & Co., Stanley-Atha tools, Logan gear flywheels and Pioneer connecting rods and Standard ignition parts.

The Horan concern has installed a complete automotive machine shop. Towers Motor Parts Company of Lowell has doubled its floor space and is stocking a complete line of replacement parts and equipment.

The Bay State Cylinder Grinding Company, Taunton, has added Ramco rings, Rusco fan belts and Accuralits pistons. The Perry Auto Company, Taunton, has taken on the line of Goodyear fan belts, rubber tire chains and radiator hose and the Fitzgerald line of gaskets and felt washers.

The Crompton Electric Company, Lawrence, has added Bosch and Delco-Remy ignition parts, Manhattan battery cable and Zenith carburetors.

The Essex Tire and Supply Company, Lynn, announces it is now handling Whitney timing chains, Westinghouse Mazda bulbs, Parker vises, Lemco axles and Eco compressors.

The Franklin Auto Supply Company, Brockton, has placed in stock Dall pistons, King valves, Gray-Rock brake lining, Trico windshield cleaners, Weed chains, Wonder Worker line and Everready grease guns.

DANBURY, CONN., FIRM WILL MOVE ON APRIL 1

Danbury, Conn., Jan. 21.—Harry's Auto Parts store, 42 White St., will move April 1 into larger quarters at Bridge and White Streets, Harry Harris, proprietor, having leased space now occupied by a drug store. In addition to carrying a full line of parts and accessories, the concern does grinding and maintains a machine shop serving the automotive trade.

NEWTON STEEL CORP. TO OPEN NEW PLANTS FEB. 17

Monroe, Mich., Jan. 21.—The Newton Steel Corporation is planning to begin operations in its plants here February 17, it has been announced. These plants have been under construction since April. The company expects to employ 1,000 men on the opening day, while others will be added later. Workers now are installing machinery.

Shows How to Utilize Space in Small Store

HERE IS THE JOBBING ESTABLISHMENT of Fred B. Crafts Company, Inc., West Palm Beach, Fla., which shows what can be done with limited space

Editor's Column

INTENSIVE competition for the control of consumer markets this year will bring independent business men and the huge organization which has grown out of recent mergers into sharper conflict than ever before, Mark M. Jones, consulting economist believes. In the fight between these two forces in distribution, he feels that the independents have the best chances for success, provided thep co-operate in their operations and present a solid front against their rivals.

"Independent manufacturers, jobbers and retailers will have to come closer together if they hope to hold their ground against the large corporations now performing all these functions under one ownership," Mr. Jones says. "Conservative buying by the public this year is going to restrict markets, and in the struggle to maintain volume the two opposing forces are bound to come into conflict.

"The independent business man has the good will of the public behind him and, in addition, has more initiative than the salaried employees of his opponents. It is up to him to apply the same amount of study and research which the chains have given to the distribution problem, and I am confident that this will be done.

"There are no advantages in chain operation which the independent cannot enjoy provided he is willing to co-operate with other independents. Failure to do this has been the big stumbling block in the past, but sharper competitive conditions this year will force a different view of the matter.

"A co-operative scheme of operation, in which the different links from producer to retailer will come together in a closely knit association of independently owned business units enjoying the economies of chain operation, but retaining the advantages of independent ownership, is undoubtedly in the process of evolution. The system will not develop in a single year, but I expect long strides in that direction during the next twelve months."

To the independent manufacturer in such a line-up, Mr. Jones assigns the role of anchor man in the impending tug-of-war for the consumer patronage.

"Upon him will fall the chief responsibility for the success of the combination," he explains. "The work of studying potential markets for his products and gauging production accordingly must be performed by the producer. He must acquire a thorough knowledge of the problems of both wholesalers and retailers and be in a position to help when they look to him for advice and guidance.

"Suggestions for possible economies in distribution and improved methods of merchandising should emanate from this source to the other two divisions.

"The wholesaler finds himself in the most vulnerable position of the three as a result of chain growth, and must struggle harder for the present, at least, to justify his place in the scheme. The responsibility for seeing that retailers are not oversupplied with stocks and that the manufacturer is able to keep his products moving at an even pace rests with the jobber.

"The retailer, helped by counsel from the wholesaler and manufacturer, should be able to keep up with the developments in modern merchandising methods. His biggest problem will be in judging the tastes and buying capacities of his customers and in regulating his stocks accordingly."

Wholesale Brevities

Seattle, Wash., Jan. 21.—W. L. Strahl, manager of Ballou & Wright, automotive jobber, has been elected president of the Broadway Commercial Club, an organization in Seattle's automobile district.

Newark, N. J., Jan. 21.—Wholesalers in Newark recently met to organize plans for co-operation. Eight Newark wholesalers and their salesmen, who where present at the meeting, constituted a group of about forty persons. S. E. Nichols of the Elin Auto Supply Company presided.

New York, Jan. 21.—Automotive Replacement Parts Company has leased space in the William F. Kenny Building, 44-60 East 23d St.

Rochester, N. Y., Jan. 21.—The C. L. Hartmann Corporation, headed by C. L. Hartmann, has taken over and will continue the operation of the Starter and Ignition Service Company, Inc., at 18-20 North Union St. here. The firm will specialize in the distribution of Delco batteries and electrical automobile equipment, both wholesale and retail.

Paterson, N. J., Jan. 21.—Max B. Wilson, formerly traveling Pacific Coast territory for Durwyllan Company of Paterson, has been appointed city salesman for the Lambert Company of San Francisco, Cal.

TRANSITONE AND WILLARD UNITE TO MERCHANDISE, SERVICE CAR RADIOS

Cleveland, Jan. 21. — Announcement is made by C. Russell Feldmann, president of the Automobile Radio Corporation, that merchandising arrangement had been effected between the company and Willard service stations, whereby this nation-wide sales and service organization would be available to motorists for the sale, installation and service of Transitone, the automobile radio.

The announcement was made public at the annual meeting of the Willard sales and service body held here, and represents the culmination of many weeks of negotiations between the two industries.

The merchandising arrangement will mean that Transitone automobile radios may be bought, installed and serviced at any of the net work of 42,000 Willard service stations in the United States.

OSCAR A. PETERS WILL BUILD IN FULTON, N. Y.

Fulton, N. Y., Jan. 21.—Oscar A. Peters of Phoenix, N. Y., manufacturer of windshield wipers, small hardware and other accessories made of steel, will build a new plant in this city, to be started at once. The new building will be one story, 60x90 feet and 20 feet in height. This will be the first unit of Peters' plant, which it is expected will be enlarged later on. Mr. Peters is moving to Fulton to increase his manufacturing facilities, having recently signed a large contract with the H. H. Franklin Manufacturing Company of Syracuse, N. Y., maker of the Franklin automobile.

PORTLAND SECTION S. A. E. HOLDS FIRST MEETING

Portland, Ore., Jan. 21.—The newly formed Portland section of the Society of Automotive Engineers held its first regular meeting at the Multnomah Hotel. Temporary officers of the new section are: A. R. Trombley, chairman; H. W. Drake, C. C. Humber, F. G. Baender, E. J. Blaser, vice-chairmen; F. P. Myers, secretary, and J. Verne Savage, treasurer.

AIRPLANE EXHIBIT FEATURE OF SHOW IN MILWAUKEE

Milwaukee, Wis., Jan. 21.—A feature at the Milwaukee Automobile Show last week was the display of airplanes, the first time planes have ever been displayed at a local automobile show. The Midwest Airways exhibited a Fairchild cabin plane and a Ryan monoplane.

PHILADELPHIA JOBBERS TO HOLD CO-OPERATIVE CLINIC MARCH 5, 6, 7

Philadelphia, Jan. 21.—Six Philadelphia jobbers will hold a co-operative exhibit or clinic in the Terminal Warehouse Building at 800 North Delaware Ave., this city, during the day and evening, March 5, 6 and 7. The jobbers are Berrodin Auto Supply, Casanave Supply Company, Gaul, Derr & Shearer Company, George W. Nock Company, Philadelphia Motor Accessories Company and Roberts Auto and Radio Supply.

Unlike most similar shows held in various parts of the country, this will be decidedly a jobber show and, to separate it from any taint of favoritism, the committee in charge has chosen H. S. Plummer to manage the affair.

The various preliminary mailing pieces, show cards, tickets, etc., will all be built around the idea, "To Make Maintenance Pay Bigger Profits in 1930."

The various garage and service station men are being invited to attend this clinic and have the various shop equipment items demonstrated and explained by manufacturers' experts.

LEE-KOUNTZE FIRM QUITS AFTER 50 YEARS

Omaha, Neb., Jan. 21.—The Lee-Kountze Hardware Company, for fifty years one of the leading wholesale hardware, automotive shop equipment, auto accesories and replacement parts houses in the Middle West, has decided to discontinue business because of conditions in the hardware jobbing industry, officers announce. The company served a territory from western Iowa to Utah and Idaho.

"On account of the unprofitable condition that has existed in the hardware jobbing industry over the past several years, and foreseeing no change, at least for the immediate future, we have decided upon liquidation of this business," Harkness Kountze, secretary of the company, states.

"The capital of the company is in no way impaired and the company is in a position to meet all obligations when they become due, as it is absolutely solvent in every respect."

EVANSVILLE JOBBER IN NEW BUILDING

Evansville, Ind., Jan. 21.—The Automotive Electric Service, Inc., distributor and service station for automotive electric products, has moved into the remodeled building at 14-16 N. E. Riverside Drive, badly damaged by fire last fall, and which has been transformed into a modern drive-in service station.

The company is distributor for Auto-Lite, Bosch, Delco-Remy, Dyneto, Luci-Neville, North East and Eisemann Magneto products and will soon add battery sales and service department, according to George B. Sligh, manager.

APEX LEASES PLANT

Syracuse, N. Y., Jan. 21.—The Apex Manufacturing Company, Inc., recently organized and incorporated by Charles F. Stanton and associates, has leased for a term of years the plant of the West Knitting Company, Emerson Avenue and Harbor Street. Machinery and equipment is being installed, and it is expected to begin operations at the plant February 1, producing a line of window and motor car ventilators.

Classified Advertising

Classified Rates 5c Per Word

AN OPPORTUNITY
TO BUILD YOUR BUSINESS

Service manager, 28 years with industry. Experienced executive. A proven builder of business. Now employed. Would like change for position with larger scope. Box 255, Automotive Daily News, Graybar Bldg., New York City.

CHEVROLET DEALERS HEAR SALES PLANS

(Continued from Page 1)

Kother, director of sales and advertising, General Motors; J. D. McLeod, Flint zone manager; C. F. Barth, vice-president; W. S. Knudsen, president and general manager; H. J. Klingler, vice-president and general sales manager; J. C. Chick, assistant general sales manager; C. L. Alexander, regional sales manager; A. H. Goodman, Detroit zone manager; Sidney Corbett, manager truck division; D. P. O'Keefe, purchasing agent; W. A. Blees, assistant general sales manager; J. P. Little, president Motor Accounting Company; V. L. Triplett, Detroit assistant zone manager; J. E. McLaughlin, manager G. M. A. C., Detroit branch; J. W. Ryder, Detroit city sales manager; Charles Boutin, Flint zone parts and service manager; J. A. Jamieson divisional controller; E. W Ivey, resident controller; R. H. Russell, regional sales promotion manager; K. E. Gray, assistant manager Dealer Finance; T. O. McLoughlin, central office sales promotion department; W. T. Agee, regional parts and service manager; C. H. Didricksen, regional manager, G. M. A. C.

INCOME TAX DEDUCTIONS ON GASOLINE PERMITTED

Washington, Jan. 21.—The Bureau of Internal Revenue has ruled that motorists of thirteen states are entitled to a deduction in their Federal income tax of the sum spent last year for gasoline taxes. Motorists in five states and the District of Columbia, however, are not given the privilege since their gasoline tax laws specifically impose the tax upon the distributor rather than the consumer. Tax laws of only eighteen states have thus far been interpreted by the bureau.

In the following states the deduction is permitted: Pennsylvania, Illinois, Washington, Massachusetts, Rhode Island, Wisconsin, Delaware, Kentucky, New York, Michigan, Missouri, North Carolina and Virginia.

In Ohio, Maryland, Georgia, Connecticut and Colorado no deduction is permitted.

WILLYS-OVERLAND DEALER

Buffalo, Jan. 21.—The Willys-Overland Company has appointed the Pierce-Smale Corporation as its dealer for Niagara Falls and surrounding territory. The Pierce-Smale Company recently opened a new sales and service station at 245 Portage Road, Niagara Falls.

KEY TO ABBREVIATIONS USED IN THIS TABLE

GENERAL

*In addition to its regular line Oldsmobile also offers a de luxe line. De luxe equipment includes: Six wire wheels (with six tires and tubes), two wheels carried in front fender wells and securely locked in position, chromium-plated headlamps, four spring boots, folding trunk rack at rear and sheet metal fenders, etc. ducoed in color on those models on which ducoed sheet metal is more harmonious than is black enameled sheet metal. It is also a a special line for 1929.

SPEEDOMETER

AC—AC Spark Plug Co., Flint, Mich.
NE—North East Electric Co., Rochester.
Ste—Stewart-Warner Speedometer Corp., Chicago.
Wal—Waltham Watch Co., Waltham, Mass.

CLOCK

Borg—Borg Clock Co.
Jag—Jaeger Watch Co., New York city.
NH—New Haven. See Phi.
Phi—Phinney-Walker Co., New York city.
Ster—Sterling Electric Clock Corp., New York city.
Wal—Waltham Watch Co., Waltham, Mass.

FUEL GAUGE

Bos—Boston Auto Gauge Co., Pittsfield, Mass.
Gro—Grolan Co., Dayton, O.
KS—King Seeley Corp., Ann Arbor, Mich.
Nag—Safe-T-Stat Co., Toledo, O.
Moto-M—Moto Meter Co., Inc., L. I. City, N. Y., and La Crosse, Wis.
Roc—Rochester Mfg. Co., Rochester, N. Y.
Ster—Sterling Electric Clock Corp., New York city.
US—U. S. Gauge Co., New York city.
Nat—National Gauge & Equip. Subsidiary of the Moto Meter Company, Long Island City.

LOCK

BS—Briggs-Stratton Co., Milwaukee.
Blos—Blossom, Delco-Remy Corp., Anderson, Ind.
Mc—Mitchell Specialty Co., Holmesburg.
D-R—Delco-Remy Corp., Anderson, Ind.
Her—Hershey Mfg. Co., Chicago.
Joh—Johnson Automobile Lock Co., St. Louis, Mo.
N. E.—North East Electric, Rochester, N. Y.
Sha—Shaler Lock Co., Milwaukee, Wis.

SPARK PLUG

AC—AC Spark Plug Co., Flint, Mich.
Cha—Champion Spark Plug Co., Toledo, O.

BATTERY

Ex—Electric Storage Battery Co., Philadelphia.
Nat—National Lead Battery Co., St. Paul, Minn.
Pre—Prest-O-Lite Co., Indianapolis, Ind.
USL—U. S. L. Battery Corp., Niagara Falls, N. Y.
Wil—Willard Storage Battery Co., Cleveland, O.
D-R—Delco-Remy.
*Also using USL and D-R.

HEAT INDICATOR

AC—AC Spark Plug Co., Flint, Mich.
Mot-M—Moto Meter Co., Inc., Long Island City, N. Y., and La Crosse, Wis.
Safe-T—Safe-T-Stat Co., Brooklyn, N. Y.

CIGAR LIGHTER

Cas—Casco Products Corp., Bridgeport, Conn.
*Cigar lighters in many cases are optional equipment, and are not standard on all models, the names of lighters shown indicate the makes supplied to various car makers.
Cuno—Cuno Engineering Corp., Meriden, Conn.
GR—Grand Rapids Metalcraft Corp., Grand Rapids, Mich.
Balc—Cincinnati Ball Crank Co., Cincinnati, O.
Met—Metal Specialties Mfg. Co.
NE—Northeast "Hot-Heads."

SMOKING AND VANITY SETS

AWS—Art Metal Works, Newark, N. J.
Fis—Fisher Body Corp., Detroit.
GR—Grand Rapids Metalcraft Corp., Grand Rapids, Mich.
Lin—Linden.
V S—Van Sicklen Corp., Elgin, Ill.
Tern—Ternstedt Mfg. Co., Detroit, Mich.
McF—McFarlan.

BODY FINISH

Arco—John L. Armitage & Co., Newark, N. J.
Clev—Cleveland Varnish Co.
Ditz—Ditzler Color Co., Detroit, Mich.
Duc—E. I. du Pont de Nemours & Co., Philadelphia.
Egypt—Egyptian Lacquer Co.
Gli—Glidden Co., Cleveland, O.
Mou—Mountain Varnish & Color Works, Toledo, O.
Mur—Murphy Varnish Co., Newark, N. J.
Rin—Rinshed Mason Company, Detroit.
Val—Valentine & Co., New York city.
VEP—V. E. P. Co., St. Louis, Mo.
*Also using Val.
*Various models.

STOP AND PARKING LIGHTS

Vic—Cincinnati-Victor Co., Cincinnati, O.
Aga—Federal Pressed Steel Co., Chicago.
Cor—Corcoran Co., Cincinnati, O.
D-R—Delco-Remy Corp., Anderson, Ind.
Gui—Guide Motor Lamp Mfg. Co., Cleveland, O.
Hal—Hall Lamp Co., Cincinnati, O.
Ind—Indiana Lamp Corp., Connersville, Ind.
Sto—Stover Signal Engineering Co., Racine, Wis.
JB—John Brown Lamp Co.
*Also using Cor. †Also using Ind.

WINDSHIELD WINGS

†Not standard equipment.
Kok—Fulton Co., Milwaukee, Wis.
Per—Perfection Heater & Mfg. Co., Cleveland, O.
DR—Delco-Remy.

HEATER

Gla—Gladiator Mfg. Co., Auburn, Ind.
Kel—Kelch; made by Grand Rapids Metalcraft Corp., Grand Rapids, Mich.
Per—Eaton Axle & Spring Co., Cleveland.
*Special equipment.

BUMPERS

Bad—Badger Mfg. Corp., Milwaukee.
Bif—Biflex Corp., Waukegan, Wis.
Buck—See Cen.
Cen—Central Brass & Fixture Co., Springfield, O. Also makers of Buckeye bumpers.
CG—CG Spring & Bumper Co., Detroit.
Eat—Eaton Axle & Spring Co., Cleveland.
NM—New Method.
Ste—Stewart-Warner Speedometer Corp., Chicago.
US—United States Chain Co.
USE—U. S. E. Corp., Long Island City.
†Extra equipment.
*Also using Eat.

WIRE WHEELS

†Not standard equipment.
Budd—Budd Wheel Co.
Moto W—Motor Wheel Corporation.
Day—Dayton Wire Wheel Co., Dayton, O.
K-H—Kelsey-Hayes.
Buffalo—Wire Wheel Corporation of America, Buffalo, N. Y.

SHOCK ABSORBERS

Con—Continental Motors.
Gab—Gabriel Snubber Mfg. Co., Cleveland.
Hou—Houde Engineering Corp., Buffalo, N. Y.
Lov—Delco-Remy Corp., Anderson, Ind.
Mon—Monroe.
Wat—John Warren Watson Co., Philadelphia.

Passenger Car Equipment and Accessories

Name and Model	Speedometer	Clock	Fuel Guage on Dash	Lock	Spark Plugs	Battery	Heat Indicator	*Cig. Lighter	Smoking Set	Vanity Set	Make of Body Finish Used	Stop Light	Parking or Side Light	Windshield Wings	Heater	Front Bumper	Rear Bumper	Wire Wheels	Shock Absorber
Auburn 8-95 ...	Ste	—	K-S	Ele	Cha	U S L	Mot-M	Cas	G R	—	Mur	Ind	Ind	—	*Gla	Balc	Balc	Day	Lov
Auburn 6-85 ...	Ste	—	K-S	Ele	Cha	U S L	Mot-M	Cas		—	Mur	Ind	Ind	—	*Kel	Balc	Balc	Day	Lov
Auburn 125	Ste	—	K-S	Ele	Cha	U S L	Mot-M	Cas	G R	—	Mur	Ind	Ind	—	*Gla	Balc	Balc	Day	Lov
Blackhawk 6 ...	Ste	Borg	Mot-M	DR	Cha	Pre	Mot-M	Cas	Lin	Lin	Val	Ind	Ind	Kok	—	Buck	Buck	Buffalo	Lov
Blackhawk 8 ...	Ste	Borg	Mot-M	DR	Cha	Pre	Mot-M	Cas	Lin	Lin	Val	Ind	Ind	Kok	—	Buck	Buck	Buffalo	Lov
Buick 40	A C	—	K-S	Her	A C	Ex	A C	Yes	Tern	Tern	Duc	DR	DR	—	—	—	—	Buffalo	Lov
Buick 50	A C	—	K-S	Her	A C	Ex	A C	Yes	Tern	Tern	Duc	DR	DR	—	—	—	—	Buffalo	Lov
Buick 60	A C	—	K-S	Her	A C	Ex	A C	Yes	Tern	Tern	Duc	DR	DR	—	—	—	—	Buffalo	Lov
Cadillac	A C	Jag	Nag	DR	A C	Ex	A C	Cas	Tern	Tern	Duc	Own	Hal	DR	*Kel	USE	USE	Buffalo	Lov
Chevrolet	A C	—	—	DR	A C	*Wil	Safe T	—	Fis	—	Duc	DR	DR	—	*Own	†Own	Own	—	—
Chrysler 80	A C	Ster	Mot-M	Ele	A C	Wil	Mot-M	Cas	AWS	AWS	Duc	*Hal	*Hal	Per	—	N M	N M	MotoW	Hou
Chrysler 77	N E	—	Mot-M	Ele	A C	Wil	Mot-M	Cas	AWS	AWS	Duc	*Hal	Hal	Per	—	N M	N M	—	Lov
Chrysler 70	N E	—	——	Ele	A C	Wil	Mot-M	Cas	AWS	AWS	Duc	*Hal	Hal	Per	—	N M	N M	—	Lov
Chrysler 66	N E	—	——	Ele	A C	——	Mot-M	Cas	—	—	Duc	—	Hal	—	—	—	—	—	—
De Soto 6	N E	—	Mot-M	Sha	A C	Wil	—	—	AWS	AWS	Duc	*Hal	*Hal	Per	—	Yes	Yes	MotoW	Lov
De Soto 8	—	—	Mot-M	—	A C	Wil	Mot-M	—	—	—	—	Hal	—	—	—	—	—	—	Lov
Dodge Six	N E	—	Mot-M	N E	Cha	Wil	Mot-M	—	—	—	—	*Hal	*Hal	—	—	—	—	—	Lov
Dodge Senior 6.	N E	—	Mot-M	N E	Cha	Wil	Mot-M	—	G R	G R	—	*Ind	*Hal	—	—	—	—	—	Lov
Dodge DD	N E	—	Yes	—	Cha	Wil	Mot-M	—	—	—	—	Hal	—	—	—	—	—	—	Lov
Dodge 8	N E	—	Yes	—	Cha	Wil	Mot-M	—	—	—	—	Hal	—	—	—	—	—	—	Lov
Durant 40	N E	—	Roc	—	A C	U S L	—	—	—	—	Rin	Cor	Cor	Kok	—	Ste	Ste	Budd	Wat
Durant 60	N E	—	Nag	—	A C	U S L	—	—	—	—	Rin	Cor	Cor	Kok	—	Ste	Ste	Budd	Wat
Durant 6-14 ...	N E	No	Mot-M	Ele	A C	U S L	Yes	No	—	—	—	Cor	—	—	—	—	—	—	Mon
Durant 6-17 ...	N E	No	Mot-M	Ele	A C	U S L	Yes	D R	—	—	—	Cor	—	—	—	—	—	—	Mon
Elcar 6-75	Ste	—	Mot-M	Sha	Cha	U S L	Mot-M	Cas	—	—	Mur	Hal	Hal	—	—	Ste	Ste	—	Con
Elcar 8-95	Ste	—	Mot-M	Sha	Cha	U S L	Mot-M	Cas	—	—	Mur	Gui	Gui	—	—	Ste	Ste	—	Con
Elcar 8-96	Ste	Borg	Mot-M	Sha	Cha	U S L	Mot-M	Cas	—	—	Mur	Hal	Hal	—	Per	Ste	Ste	—	Con
Elcar 8-130	Ste	Borg	Mot-M	Sha	Cha	U S L	Mot-M	Cas	—	—	Mur	Hal	Hal	—	Per	Ste	Ste	—	Con
Essex Super 6 ..	Ste	—	Mot-M	Ele	A C	Ex	Mot-M	—	—	—	Ditz	JB	Yes	—	—	U S	U S	MotoW	Mon
Erskine 53	Ste	No	Mot-M	Yal	—	Wil	Mot-M	No	No	No	—	Ind	—	—	No	Eat	Eat	—	Lov
Ford A	Ste	—	Own	Ele	Cha	Own	—	—	—	—	—	Yes	—	—	—	—	—	Own	Hou
Franklin 145-147	N E	Jag	King	Yal	Cha	Wil	—	Cas	G R	G R	*Duc	JB	JB	—	Kel	Gen	Gen	MotoW	Wat
Gardner 150 ...	Ste	Phi	Mot-M	DR	Cha	Pre	Mot-M	Cas	G R	—	Ditz	Cor	Cor	—	—	—	—	MotoW	Lov
Gardner 140 ...	Ste	—	Mot-M	DR	Cha	Pre	Mot-M	Cas	—	—	Ditz	Cor	Cor	—	—	CG	CG	MotoW	Lov
Gardner 136 ...	Ste	—	Mot-M	DR	Cha	Pre	Mot-M	Cas	—	—	Ditz	Cor	Cor	—	—	CG	CG	MotoW	Lov
Graham Stan. 6	N E	—	K-S	Oak	Cha	Wil	Mot-M	—	G R	G R	—	Hal	Hal	—	—	Ste	Ste	MotoW	Lov
Graham Sp. 6..	N E	—	K-S	Oak	Cha	Wil	Mot-M	—	G R	G R	—	Hal	Hal	—	—	Ste	Ste	MotoW	Lov
Graham Stan. 8	N E	—	K-S	Oak	Cha	Wil	Mot-M	Cas	G R	G R	—	Hal	Hal	—	—	Ste	Ste	MotoW	Lov
Graham Sp. 8..	N E	—	K-S	Oak	Cha	Wil	Mot-M	Cas	G R	G R	—	Hal	Hal	—	—	Ste	Ste	MotoW	Lov
Graham Cust. 8	N E	—	K-S	Oak	Cha	Wil	Mot-M	Cas	—	—	—	Hal	Hal	—	—	Ste	Ste	MotoW	Hou
Hudson 8	Ste	—	Mot-M	Ele	A C	Ex	Mot-M	—	—	—	Duc	JB	—	—	—	Eat	Eat	MotoW	Wahl
Hupmobile H ..	Ste	—	Ster	Ele	Cha	Wil	Mot-M	Cas	—	—	Val	Hal	Hal	—	—	—	—	—	Mon
Hupmobile C ..	Ste	—	Ster	Ele	Cha	Wil	Mot-M	Cas	*Yes	*Yes	Val	—	Hal	—	—	—	—	—	Mon
Hupmobile S ..	Ste	—	Ster	Ele	Cha	Wil	Mot-M	Cas	—	—	Val	—	—	—	—	—	—	—	Mon
Jordan Mod. 8G	Ste	Ster	Nat	Her	Cha	Wil	Nat	N E	G R	—	Dit	Ind	JB	—	—	Eat	Eat	K-H	Hou
Jordan Mod. 8T	Ste	Ster	Nag	Her	Cha	Wil	Nag	—	—	—	Dit	Ind	Ind	—	—	Eat	Eat	K-H	Hou
Kissel 6-73	A C	Yes	Gro	Ign	A C	Wil	A C	Cas	Yes	Yes	Duc	Sto	—	—	Per	Bad	Bad	—	Lov
Kissel 8-95	A C	Yes	Gro	Ign	A C	Wil	A C	Cas	Yes	Yes	Duc	Sto	—	—	Per	Bad	Bad	—	Lov
Kissel 8-126	A C	Yes	Gro	Ign	A C	Wil	A C	Cas	Yes	Yes	Duc	Sto	—	—	Per	Bad	Bad	Day	Lov
La Salle	A C	Jag	Nag	DR	A C	Ex	A C	Cas	Tern	Tern	Duc	Own	Hal	DR	*Kel	USE	USE	Buffalo	Lov
Lincoln 8	N E	Wal	K-S	Her	Cha	Ex	—	Cas	Cuno	Yes	*Duc	Own	Own	Own	—	Bif	Bif	Own	Hou
Marmon 69	Ste	—	Mot-M	Sha	Cha	Nat	Mot-M	Cas	AWS	AWS	*Duc	Hal	Hal	Kok	—	—	—	†Day	Lov
Marmon 79	Ste	Borg	Mot-M	Blos	Cha	Nat	Mot-M	Cas	AWS	AWS	*Duc	Hal	Hal	Kok	—	—	—	†Day	Lov
Marquette	A C	—	K-S	Her	A C	Ex	—	—	A C	Yes	Duc	DR	—	—	—	—	—	Buffalo	Lov
Nash Tw. Ign. 8	A C	Borg	K-S	Blos	A C	U S L	Mot-M	Yes	G R	G R	Duc	Hal	Hal	—	—	Eat	Eat	MotoW	Lov
Nash Tw. Ign. 6	A C	—	K-S	Blos	A C	U S L	Mot-M	—	AWS	—	Duc	Hal	Hal	—	—	Ste	Ste	MotoW	Lov
Nash Single	A C	—	K-S	Blos	A C	U S L	A C	—	—	—	Duc	JB	JB	—	—	Ste	Ste	MotoW	Lov
Oakland 8	A C	—	K-S	DR	A C	Wil	A C	—	†Fis	†Fis	Duc	DR	Ind	—	—	CG	CG	MotoW	Lov
*Oldsmobile ...	A C	—	K-S	DR	A C	Wil	A C	—	Tern	—	Duc	DR	—	—	—	Own	Own	MotoW	Lov
Packard 726-733	N E	Jag	K-S	—	Cha	Pre	Mot-M	Cas	Own	Yes	Val	Own	Own	†Yes	Kel	Cen	Yes	†Yes	Own
Packard 740-745	N E	Jag	K-S	—	Cha	Pre	Mot-M	Cas	Own	Yes	Val	Own	Own	†Yes	Kel	Cen	Yes	†Yes	Own
Peerless Mast. 8	A C	—	Mot-M	Sha	Cha	U S L	Mot-M	Cas	G R	—	Val	Cor	Cor	—	—	Bif	—	—	Lov
Peerless Cust. 8	A C	Ster	Mot-M	Ele	Cha	U S L	Mot-M	Cas	G R	G R	Val	Cor	Cor	Kok	—	Bif	—	—	Lov
Pierce-A., C.B.A	Wal	Wal	Mot-M	Ele	Cha	Wil	Mot-M	N E	—	—	—	Aga	—	—	—	Eat	Eat	K H	Hou
Plymouth	N E	—	Roc	Sha	A C	Wil	—	—	—	—	Duc	*Hal	*Hal	—	—	CG	CG	K-H	—
Pontiac	A C	—	K-S	DR	A C	Pre	—	—	†Fis	†Fis	Duc	DR	DR	—	—	CG	CG	Buffalo	Lov
Reo, 15, 20, 25..	Ste	—	K-S	D R	Cha	Wil	Mot-M	—	—	—	—	Gui	—	—	—	C G	C G	MotoW	Lov
Roosevelt 8	Ste	—	Mot-M	DR	Cha	Nat	—	—	—	—	—	Vic	Vic	—	—	—	—	—	—
Studebak'r Dict 8	Ste	—	K-S	Her	Cha	Wil	Natl	—	—	—	—	Ind	—	—	—	—	—	—	Lov
Studebak'r Dict 6	Ste	—	K-S	Her	Cha	Wil	Natl	—	—	—	—	Ind	—	—	—	—	—	—	Lov
Stud. Com. 6 ..	Ste	N H	K-S	Her	Cha	Wil	Mot-M	Yes	—	—	—	Ind	—	—	—	—	—	K-H	Lov
Stud. Com. 8 ..	Ste	N H	K-S	Her	Cha	Wil	Mot-M	Yes	—	—	—	Ind	—	—	—	—	—	K-H	Lov
Studebak'r Pres.	Ste	N H	K-S	Her	Cha	Wil	Mot-M	Yes	—	—	—	Ind	—	—	—	—	—	Budd	Hou
Stutz	Ste	Borg	Mot-M	DR	Cha	Pre	Mot-M	Cas	Lin	Lin	Val	Ind	Ind	Kok	—	Buck	Buck	Buffalo	Lov
Viking 8	A C	—	K-S	D-R	A C	Wil	A C	--	V S	V S	Duc	DR	—	—	—	Own	Own	MotoW	Lov
Whippet Four ..	N E	—	Roc	Ele	Cha	U S L	—	—	—	—	Mou	Ind	—	—	—	—	—	Buffalo	Gab
Willys 6	N E	—	Mot-M	Ele	Cha	U S L	Mot-M	—	—	—	—	—	—	—	—	—	—	—	Mon
Willys-K. 66B ..	N E	—	Nag	—	Cha	U S L	—	Cas	—	—	Mou	Ind	Yes	—	—	—	—	Buffalo	Gab
Willys-K. 70B .	N E	—	Nag	Ele	Cha	U S L	Mot-M	Cas	G R	G R	Mou	Ind	Yes	—	—	—	—	Budd	Wat
Windsor 6-72 ..	Ste	—	Mot-M	Joh	Cha	U S L	Mot-M	—	Yes	Yes	Gli	JB	JB	—	—	Yes	Yes	—	Lov
Windsor 8-85 ..	Ste	—	Mot-M	Joh	Cha	U S L	Mot-M	—	Yes	Yes	Gli	Ind	JB	—	—	Yes	Yes	Yes	Lov
Windsor 8-92 ..	Ste	—	Mot-M	DR	Cha	U S L	Mot-M	—	Yes	Yes	Gli	Ind	JB	—	—	Yes	Yes	Yes	Lov

Missouri, Florida Truck Registrations Up Sharply

1929 SALES SET ALL TIME MARKS

December Business Remains at Excellent Level

NEW YORK, Jan. 21.—Complete new commercial car registration reports for December and all of 1929 from two widely separate Southern States — Missouri and Florida—tell the same story of large increases over the preceding year.

Sales, as indicated by the registrations, kept at high levels right through until the end of 1929, although there was some seasonal slowing up from November. December sales in both states, however, showed substantial gains over the corresponding month of 1928 and complete sales for the year were greatly in excess of 1928.

The December sales in Missouri amounted to 551, as compared with 340 in December, 1928, a gain of 211 units, equivalent to 62 per cent.

In Florida the December registrations reached 291, as against 275 in the corresponding month of 1928, an increase of 116 cars, equal to 42 per cent.

This was, in both cases, greatly in excess of the gains the country as a whole is expected to show for the final month of 1929. Based on registration reports received to date, the gain for the month over 1928 is not expected to run above 25 per cent.

The increases shown by these two states in 1929 over the business of all of 1928 also ran higher than that expected for the country as a whole, indicating that the truck business in the South during 1929 was better than in most of the other sections of the country. Both states set new high records.

Commercial car sales in Missouri for 1929, as judged by registrations, amounted to 16,047, as compared with 9,882 in 1928, an increase of 6,169 units, equivalent to 62 per cent. This was the same rate of gain shown in December over the corresponding month of 1928.

In Florida the total commercial sales in 1929 reached 5,395, as against 3,473 in the preceding year, an increase of 1,922 units, equal to 55 per cent.

It is now estimated on the basis of returns received that the commercial car sales for the entire country in 1929 exceeded those of 1928 by 50 per cent.

A large share of the increase in December sales in Missouri over the corresponding month of 1928 was accounted for by Ford and Chevrolet, with the latter leading with a gain of 118. Ford's increase was 94. Other makes of trucks more heavily registered in December, 1929, than in the corresponding month of 1928 were Dodge, Whippet, White, Fargo, Brockway-Indiana, Sterling, Mack and Studebaker. Diamond T, Autocar, Federal and Rugby sold the same number in December, 1929, as in December, 1928.

Ford showed the largest increase in 1929 over 1928, with 4,365, with Chevrolet's increase amounting to 1,293. Other makes of trucks to show gains for all of 1929 over 1928 were International, G. M. C., Whippet, Diamond T, Mack, Federal, Brockaway-Indiana, Fargo and Autocar.

Six makes of commercial cars were more heavily registered in Florida in December, 1929, than in the corresponding month a year ago. They were the Ford, Chevrolet, Reo, Brockway-Indiana, Whippet and Studebaker.

For the full year 1929 seven makes among the leading ten sellers in Florida showed gains. They were Ford, Chevrolet, International, White, Brockway-Indiana, Mack and Whippet.

The five best sellers last year in Florida, in the order of their rank, were Ford, Chevrolet, International, Dodge and Reo. In 1928 the order for the first was Ford, Chevrolet, Graham, now the Dodge; G. M. C. and International. The second five in Florida in 1929 were G. M. C., White, Brockway-Indiana, Mack and Whippet.

The five best sellers in Missouri in 1929, in the order of their rank, were Ford, Chevrolet, International, Dodge and G. M. C. In 1928 the first five were ranked as follows: Chevrolet, Ford, Graham, International and G. M. C.

Following are the December, 1929, new commercial car registrations in Missouri, as compared with December, 1928:

	1929	1928	Gains
Ford	268	174	94
Chevrolet	155	37	118
Dodge	39	*33	6
International	23	34	..
G. M. C.	14	28	..
Reo	9	13	..
Whippet	9	4	5
White	9	3	6
Fargo	4	2	2
Brockway-Ind.	3	1	2
Diamond T	3	3	..
Sterling	3	0	3
Mack	2	0	2
Studebaker	2	1	1
Autocar	1	1	..
Dover	1	1	..
Federal	1	1	..
Rugby	1	1	..
Miscellaneous	4	4	..
Totals	551	340	†211

*Then the Graham. †Net gain. ‡Not in production.

Following are the complete 1929 sales for the fourteen leading sellers among the commercial cars in Missouri, as compared with 1928:

	1929	1928	Gains
Ford	6,659	2,294	4,365
Chevrolet	5,204	3,911	1,293
International	973	811	162
Dodge	893	*941	..
G. M. C.	544	484	60
Whippet	266	62	204
Reo	265	309	..
Diamond T	240	182	58
Mack	169	164	5
Federal	118	80	38
Brockway-Ind.	115	103	12
White	102	139	..
Fargo	71	4	67
Autocar	41	32	9

*Then the Graham.

Following are the commercial car registrations in Florida for the month of December, 1929, as compared with the corresponding month of 1928:

	1929	1928	Gains
Ford	228	171	57
Chevrolet	120	56	64
Dodge	10	*14	..
Reo	10	4	6
International	9	9	..
Brockway-Ind.	6	5	1
Whippet	4	0	4
G. M. C.	1	5	..
Mack	1	5	..
Studebaker	1	0	1
White	1	3	..
Miscellaneous	0	3	..
Totals	391	275	†116

*Then the Graham. †Net gain.

Following are the complete 1929 registrations of the ten leading sellers among the commercial cars in Florida, as compared with 1928:

	1929	1928	Gains
Ford	3,020	1,421	1,599
Chevrolet	1,723	1,322	401
International	167	116	51
Dodge	154	*226	..
Reo	76	101	..
G. M. C.	68	132	..
White	51	49	2
Brock.-Ind.	40	14	26
Mack	34	27	7
Whippet	31	9	22

*Then the Graham.

FWD TRUCK SALES IN 1929 UP 46 PER CENT. OVER 1928

Clintonville, Wis., Jan 21.—Total FWD truck sales for 1929 increased 46 per cent. over 1928, the Four Wheel Drive Auto Company reports, compared with an increase of 24 per cent. for 1928 over 1927. More than 62 per cent. of the orders last year came from FWD owners.

White Offers New 6-Cylinder Bus Model

A NEW SIX-CYLINDER bus model, designed to obtain maximum seating capacity, speed and economy of operation is now in production at the White Company. The new chassis will be known as White Model 65A, and in addition to including all the features of the Model 65 will be of longer wheel base, afford greater seating capacity, have a heavier frame, spring and axles, larger tires and will be of 18,000 pounds gross weight

INTERNATIONAL HAS NEW MODEL

Offers 3-Ton Truck With 6-Cylinder Engine

BOSTON, Mass., Jan. 21.—A new model A-5 three-ton truck is being shown here by the International Harvester Company, in the New England branch at 61 North Beacon St., Allston, during the Automobile Show. Factories at Fort Wayne are rushing work in order to have a limited number available for February delivery.

Model A-5 is powered by International Harvester's six-cylinder valve-in-head engine, with a 3⅝-inch bore and a 4½-inch stroke and 279-inch piston displacement. It is set in a three-point mounting with rubber-cushioned rear supports.

The cylinder block is cast in one piece and the engine has removable cylinder sleeves, two-piece head machined combustion chambers, seven-bearing crank shaft of drop-forged, high-carbon chrome nickel alloy steel, heat-treated statically and dynamically balanced. Three wheelbase lengths are offered, of 156, 190 and 210 inches. The frame is of pressed steel channel, with a deep center section. Pressure feed lubrication is used to all main, connecting rod, cam shaft and rocker arm shaft bearings. No pipes are used, as the drilled cam shaft acts as an oil distribution manifold.

The transmission, five speeds forward and one reverse, selective sliding gear type, is mounted in unit with the engine. Drop centered I-beams are used for the front axle, steel forged and heat treated. Reverse Elliott type steering knuckles are of drop-forged, heat-treated chrome molybdenum steel. Ball bearings have been used for vertical king pin load. In the rear a semi-floating spiral bevel gear type mechanism is employed with a heat-treated steel driving shaft, set in a malleable iron, banjo-type housing. The differential bearings are tapered rollers and pinion straddle mounted on ball bearings. Wheel bearings are of the combination straight and tapered roller type.

Standard equipment includes cowl and dash, front fenders, short running boards, front bumper, license brackets, starter, battery, horn, electric head, tail and dash lights, oil filter, air cleaner, jack and tool kit, speedometer, head indicator, ammeter, oil pressure gauge, choke and manifold heat control, mounted on the instrument panel on the dash.

Booster brakes are being provided for installation.

A manually operated winter front has been provided for cold weather operation. This is designed to be easily removable and to be quickly installed.

Cumulative New Commercial Car Registration Table, December, 1929

Returns for today: Maryland, New Hampshire, South Dakota, Vermont and the District of Columbia

Some of this data has been published previously, but it is given here complete for the convenience of our subscribers.

States	Autocar	Brockway-Indiana	Chevrolet	Diamond-T	Dodge	Dover	Fargo	Federal	Ford	G. M. C.	International	Mack	Pierce-Arrow	Relay	Reo	Republic	Rugby	Sterling	Stewart	Studebaker	Whippet	White	Willys-Knight	Miscellaneous	Totals	States
Arkansas			33		1				32		1				1						1				69	Arkansas
Delaware	2	2	17		3				37	6					2							2		1	72	Delaware
Florida		6	120		10				228	1	9	1			10					1	4	1			391	Florida
Illinois	4	5	150	33	29	1	4	2	281	26	59	11	1		12			4	3		10	5		48	688	Illinois
Maryland	6	12	80	7	33	2	4	1	171	8	24	4		1	14	2		6	3	3	3	14	2	12	412	Maryland
Minnesota		3	105		13		3	1	250	5	38	2			4		1			1	5	3		9	443	Minnesota
Missouri	1	3	155	3	39	1	4	1	268	14	23	2			9		1	3		2	9	9		4	551	Missouri
Montana			5		1				7		6										1				20	Mont.
New Hamp.			12		2				17		4	1			1							1			38	N. Hamp.
New Jersey		3	44		16		2	14	92	8	1	6			2			3			3	7		11	212	New Jer.
N. Dakota			16						20	3	2										1				42	N. Dakota
Rh. Island	1		17	1	17		2		48	4	7	7			5		1		1	1	2				114	R. Island
S. Dakota			39		2				58	2	13	6			3						4			2	129	S. Dakota
Utah			7		8				27	1	2				1		1				1				48	Utah
Vermont			2	2	1				22	5					1							1			34	Vermont
W. Virginia		1	77		30	2		1	136	8	18			1	6	1	1		2	1	5	2		6	298	West Va.
Wisconsin			125	2	23	2	2	5	220	16	23	4			13		2	9	2	3	7	6	1	10	475	Wisconsin
Dist. of Col	1		14	4	6				57	9	3	1			2				4			11		3	115	D. of Col.
Totals	15	35	1018	52	234	8	21	25	1971	116	233	45	1	2	86	3	7	25	15	12	56	62	3	106	4151	Totals

Figures in this table are from R. L. Polk & Co. of Detroit, with the exception of Illinois, which are supplied by the Robinson Advertising Service Springfield, Ill., and New Jersey, which are furnished by the New Jersey Motor List Co., New Car Division, Trenton, N. J. Readers desiring county, city or town lists, or lists of owners in any given section, may obtain these by addressing any of these three companies.

Commercial Car Registrations do not include buses.

Production -- Engineering -- Factory

S. A. E. Told of Advances in Cold Carburetion

Experiments and developments in "Cold Carburetion" are being outlined at the mixture and distribution session of the annual meeting of the Society of Automotive Engineers at the Book-Cadillac Hotel, Detroit, in a paper prepared by Carl H. Kindl of the Delco-Remy Corporation.

The complete text and illustrations as prepared by Mr. Kindl are reproduced herewith.

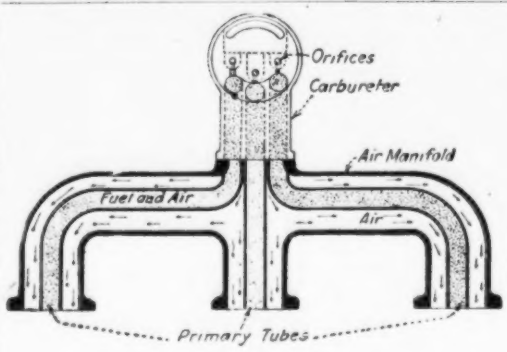


FIGURE 2—Diagram of manifold shown below in Figure 1, with carbureter attached. Throttles are placed in both the air and the fuel manifold, referred to respectively as the main and the primary manifold

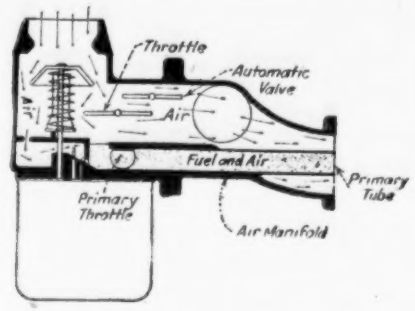


FIGURE 3 — Vertical section through center of carbureter and manifold. The stippled portion indicates the path taken by the fuel, the main and primary throttles being wide open

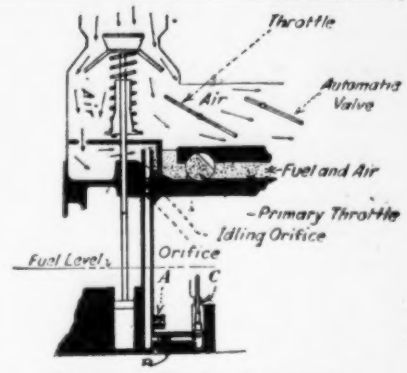


FIGURE 4—Details of carbureter. A part-throttle orifice, A, in the main tube from the fuel bowl, has a slight control of the fuel flow. Orifice B controls the power mixture. Needle C is for open-throttle operation

MEANS for obtaining the maximum power from a fixed engine-displacement is one of the present problems confronting engine designers. Considerable progress made recently in combustion chamber design has made possible the use of higher compressions without increasing detonation, thereby obtaining increased engine power. Carburetor engineers have contributed to this progress by improved manifold design for better distribution throughout the induction system. Duplex manifolds and double carbureters are used on most eight-cylinder engines to gain engine power; however, one glaring inconsistency is the application of heat to the intake gases.

The general equation for power in an internal combustion engine involves the temperature of the mixture entering the cylinder. To just what extent this temperature coefficient enters into the result depends upon several other factors, but it is always true that the power of an engine increases as the temperature of the mixture entering the cylinder decreases. With this decrease in temperature it becomes possible to increase the compression and thus afford still greater gain in output.

It is well known that a definite mixture-temperature is necessary with the conventional carbureter, so that the fuel will combine with the air in the manifold and result in furnishing the correct ratio of air to fuel in each cylinder; in other words, good distribution is assisted by the application of heat. Therefore, the problem is to design a system that will give the correct distribution of fuel and air without the use of heat. Such a system would have other advantages besides increased power, one important benefit being the short time required to operate an engine from starting under winter conditions without excessive use of the carbureter choke. Since good distribution would be obtained without heat, no warming of the manifold would be necessary as with present systems.

Methods Used in Early Work

The first work done was to use kerosene for fuel to determine what results could be obtained without vaporizing the fuel in the manifold. A single-cylinder engine was used, and it was found that liquid fuel added to the air entering the combustion chamber would produce satisfactory results. This fuel was added to the air in the valve chamber, and probably some of it was vaporized before it entered the combustion chamber. The next step was to apply the combination to a multi-cylinder engine.

One of the early manifold designs used on a six-cylinder engine in this work is shown at the top in Fig. 1. The intake ports were siamesed in pairs, and fuel was furnished through a separate tube to each valve port. A throttle was placed in each manifold leg, and these were coupled together for single control. It was found necessary to connect the three valve ports with a common tube to equalize pressures before uniform distribution was obtained. Promising results were given by this device, but much difficulty was experienced with the mechanism of the three throttles, owing to their wide distance apart and to mechanical changes resulting from engine temperatures. When the engine was not horizontal, as in climbing a long grade, the flow from the orifices was not equal because of the variation in head; but this objection was overcome by locating the orifices at the float bowl, so that the tubes carried fuel and air.

The manifold shown in two views below in Fig. 1 was then used. Fuel is delivered to the cylinder through small tubes of five-sixteenth to nine-sixteenth inch diameter, depending on the size of the engine. Air is added to the fuel merely as a means of moving the liquid, since very little vaporization occurs. Fig. 2 shows a diagram of this manifold and carburetor. Throttles are placed in both the air and the fuel manifolds, respectively referred to as the main and the primary manifolds. It is assumed that both throttles are open wide and that they do not affect the discussion. The primary manifold tubes are maintained separate from one another for some distance beyond the orifices. Each orifice supplies its tube with fuel and all operate under the same head. The tubes are filled with a super-rich mixture and, at low speeds or at low air velocities, the fuel flows as a stream in the lower portion of the tubes.

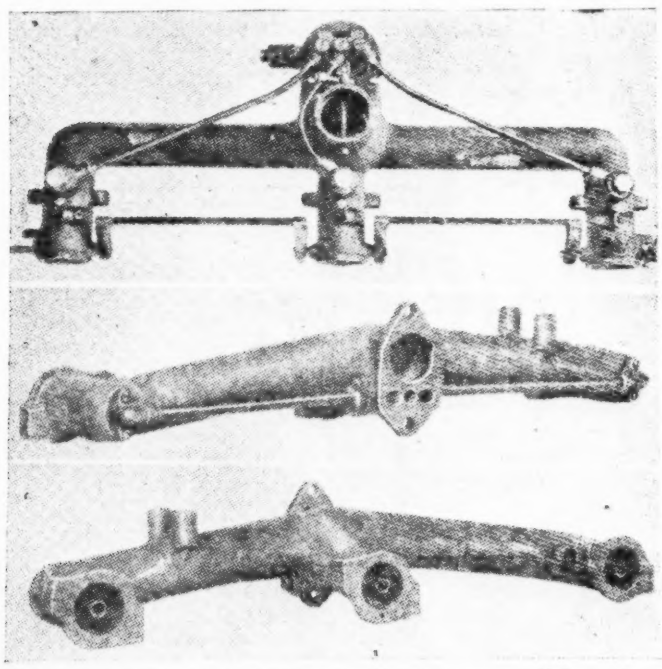


FIGURE 1 (Top)—Early design of carbureter and manifold used on six-cylinder engine. (Below)—Two views of manifold used, following the one above

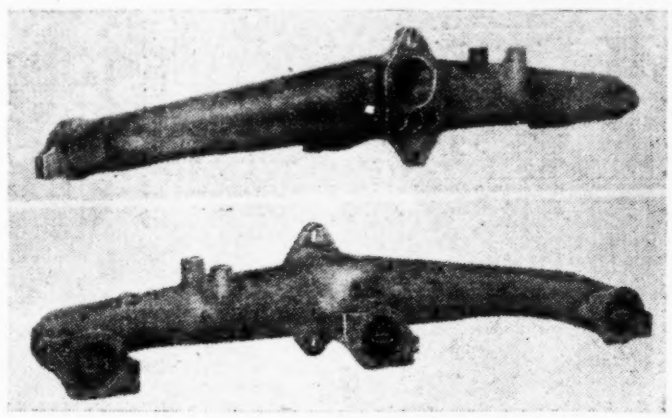


FIGURE 5—Six-cylinder manifold in which the primary tubes are cast with the manifold. The tubes are flattended to avoid the possibility of loading by having fuel collect in the botton

Glass Manifold and Stroboscope Used

Experiments were made using a glass main manifold and a neon-tube stroboscope. The action is that when a cylinder valve opens during the suction stroke, air rushes into the port and fuel is discharged from the primary tube. As the piston reaches the end of its stroke, the rush of air and fuel ceases. This repeats itself during the suction stroke of the cylinder sharing the siamesed valve port, but no fuel flow is apparent in this portion of the manifold while the cylinders of the other valve ports are having their suction strokes; however, flow is practically continuous at the orifice, but the tubes deliver fuel only during the suction stroke. Thus a proper mixture is obtained in each cylinder. Table 1 shows a sample exhaust-gas analysis obtained with the carbureter and manifold.

Table 1.—Exhaust gas analysis with a cold carburetor. Conditions: Spark advance, 36 deg.; engine speed, 1212 r. p. m.; brake load, 35.9 lb.-ft.; barometer, 29.44 in.; room temperature, 86 deg. Fahr.; inlet and outlet water temperatures, 164 and 172 deg. Fahr., respectively.

Cylinder No.	Content, Per Cent. CO.	O	CO
1	14.4	0.2	0.4
2	13.8	0.2	0.8
3	14.2	0.4	—
4	14.2	0.4	0.8
5	13.8	1.0	—
6	13.4	1.4	—

Action of Carbureter and Throttles

Fig. 3 shows a vertical section through the center of the carbureter and manifold, the stippled portion indicating the path taken by the fuel. Liquid fuel comes from the orifice, on account of the drop in the pressure under the air valve, and is picked up by the air in the primary manifold. After leaving the orifice, the fuel is conducted along a horizontal or a downward sloping path to the valve port, thus affording no occasion for the air to lift the fuel. An orifice is provided for each pair of cylinders, and each orifice is contained in its individual chamber as shown. Individual valve ports and a jet for each cylinder are naturally suggested for the ultimate in perfect distribution; but it was found that sufficiently good distribution was obtained with one orifice per pair of cylinders, and this was continued on account of simplicity.

During the idle setting of the carbureter, the main throttle is closed and practically all air is taken through the primary throttle. This results in high velocity through the small manifold and prevents loading and puddling at this throttle setting. At low part-throttle speeds, the main throttle remains closed as at idle setting, and the primary throttle opens. The engine thus runs with a small manifold, which results in several advantages. As the accelerator is opened further, the main throttle follows to the open-throttle position, as shown. The calibration of the carbureter is accomplished entirely by controlling the shape of the air valve, and operates throughout the entire range.

Other details of the carbureter are shown in section in Fig. 4. The three main jets are supplied by a common tube from the fuel bowl. This tube contains a part-throttle orifice, A, which has a slight control of the fuel flow. Orifice B controls the power mixture, which is brought into effect by the needle, C, for open-throttle operation. The carbureter is comparatively simple from the viewpoints of calibration and metering, and provides mixture-ratio control for maximum economy and power operation.

Orifice Flow and Acceleration Difficulties

One of the most intricate problems was to obtain a design in which the three orifices for the six cylinders would produce exactly similar flow. It is not merely a matter of physical dimensions of the orifices, but the movement of the air through the carbureter causes eddies and unequal pressures in varions portions of its parts, and these variations in pressure result in unequal flow from the orifices, which would cause poor distribution and poor economy. The shape of the carbureter and the location of the main orifices were determined after a long series of experiments.

Another important problem was presented by the difficulty in obtaining acceleration. When both the primary and main throttles are suddenly opened from the idle position, air rushes through the main manifold to the cylinders before the fuel reaches the valve port, since the fuel is carried through the relatively restricted small tubes while the air has a large parallel path. The weight of the fuel compared with that of the air also tends to make it lag behind the air in the main manifold.

Two solutions were suggested. One was to supply fuel forcibly to the valve chamber by some form of pump until the steady conditions were obtained; the other, to retard the air in the main manifold until the fuel in the primary tubes traveled the distance from the orifices to the cylinders. Although much time was spent on both

(Continued on Page 10)

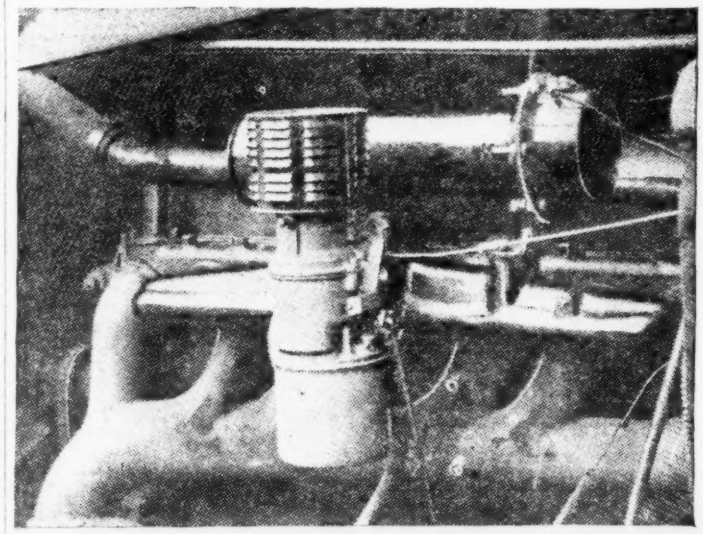


FIGURE 6—Simplicity of application of cold-carburetion system to an engine

S. A. E. to Discuss Methods Of Mixture Distribution

(Continued from Page 1)

Adventures and Future Prospects" in metal-clad airships was discussed by Ralph Upson, aeronautical engineer. At the same session, the "Importance of Dependability in Aircraft Engines" was discussed by Commander E. E. Wilson of the Standard Steel Propeller Company.

Four sessions are scheduled for tomorrow. In the morning there will be the mixture distribution session with papers on "Mixture Distribution," by Alex Taub, Chevrolet Motor Company, and "Cold Carburetion," by Carl H. Kindl, Delco-Remy Corporation.

In his paper on mixture distribution Mr. Taub reiterates known facts, which include (a) the method of charting distribution progress, (b) a suggestion for locating the error in distribution and (c) a series of thoughts on construction. Mr. Taub divides his paper into two parts, the first being a study of distribution routine and the other a discussion of a few of the problems that are met every day in the search for perfect distribution.

Complete satisfactory distribution and the quantitative measurement of its quality are the two major problems of distribution, he holds, adding, "The interrelation of these problems is mentioned and the complexity of the subject of distribution is emphasized by listing nine detailed factors, the point being made that if the information that engineers have on these items could be collected and codified considerable progress would be made.

"Following this, the usual test procedure of runs for power, economy and friction is outlined and the questions of efficiency based on air consumption, economy versus power, the maximum economy point and car-driving loads are discussed with descriptions of the procedure necessary to secure this information. A number of so-called fishhooks showing the information obtained in the tests supplement the text.

"The employment of preheated air or an externally heated T-manifold to heat the mixture is discussed and the conclusion is drawn that distribution of extremely lean mixtures is improved by the use of heated air. In connection with the method of checking the distribution by locating the weak cylinder or cylinders, the author places emphasis on the importance of using data as an indication of where the error in distribution occurs, the quantitative measurement being obtained by making a comparison of mixture fishhooks.

"In Part 2 consideration is given to the influence of the carburetor on distribution, throttle-plate deflection, balancing the airstream and the relation of manifold and valve size. The recommendation is made that the valve capacity that would give a high-speed range exceeding the requirements should be used and the top range limited to the required point by decreasing the area of the manifold. Precipitation and its control by the application of heat, the means employed to divide the wet fuel accurately and keeping the fuel in the airstream by correct design are mentioned. Concrete examples of the application of the principles outlined to manifold design are given for three types of manifold. These are the two-port and four-port six-cylinder manifold and that used on an eight-cylinder in-line engine."

Mr. Kindl's paper on "Cold Carburetion" deals with experiments made and methods employed to obtain satisfactory engine operation without the addition of heat to the fuel-air mixture.

Details of the carburetor and the throttles used were given by Mr. Kindl, together with their action when idling and when accelerating.

Application of the cold-carburetion system to an engine is comparatively simple, the author claims, as no connection is made with the exhaust manifold. It is desirable to considerably separate the intake system from the exhaust manifold to keep the air temperature low. Better results were obtained from the system applied to an overhead-valve engine than to an engine of the L-head type.

Cold carburetion, Mr. Kindl admits, still involves some difficult problems and the final results of this development cannot safely be predicted, but the advantages are so great that the author believes that cold carburetion should soon become commercial practice.

Scheduled for tomorrow afternoon is the engine session, under the chairmanship of L. P. Kalb. This session will hear two papers, one on "High-Pressure Bearing Research," by Louis Illmer, Brewer-Titchner Corporation, and one on "Downdraft Carburetion," by E. H. Shepard, Holley Carburetor Company.

At the same time there will be a foundry economics and production session, under the chairmanship of Leroy V. Cram. This meeting will hear the following papers: "Relation of Foundry Practice to Engineering," Donald Campbell, Campbell, Wyant & Cannon, and "Tungsten Carbide Steel in Production," by A. K. Brumbaugh, White Company. A business session will also be a feature of this meeting.

Louis Illmer, in his paper on "High Pressure Bearing Research," gives a comprehensive survey of representative experimental research directed toward perfect oil film lubrication. With this as a basis, the author endeavors to cor-

(Continued on Page 11)

Activity in Automotive Centers on the Uptrend

(Continued from Page 1)

part-time schedules with curtailed forces. A surplus of automobile factory labor prevailed.

Flint—One automobile factory was reported as closed at the end of December for inventory taking. All other plants were in operation, some on part time schedules.

Lansing—Two factories manufacturing automobile bodies resumed operations. Practically all factories operated on part time.

OHIO

The surplus of labor apparent throughout the state embraced practically all trades. The automobile, steel and miscellaneous plants operated on part time schedules.

Akron—One tire and rubber plant closed, but the other rubber tire establishments worked overtime.

Cleveland—The volume of employment decreased, likewise production, particularly in the automobile industry. The iron and steel mills operated on curtailed schedules.

Cincinnati—Practically all plants worked on part time schedules.

Toledo—The surplus of labor was particularly evident among semi-skilled and unskilled workers. An increase in activity is expected in the automobile and machinery factories in the near future.

WISCONSIN

There was a decrease in the volume of employment in the last month, while a surplus of factory workers prevailed.

Racine—One rubber manufacturing plant closed so certain changes could be made in its operating system.

INDIANA

Automobile factories operated on curtailed schedules. Some increase in activity was noted in the iron and steel mills.

Indianapolis—A slight surplus of factory workers prevailed in the automobile and foundry industries.

South Bend—There was a slight decrease in employment during the last month However, reports indicate there will be some improvement during the next thirty days.

MASSACHUSETTS

The usual seasonal recession in industrial production was noted throughout the state in the last thirty days.

Haverhill—The automobile body industries operated on curtailed schedules.

Springfield—One plant manufacturing small motors and one plant manufacturing tires and tubes worked with a night shift engaged.

CONNECTICUT

Reports from various parts of the state indicate a seasonal recession, with a resultant surplus of workers.

Bridgeport—The industrial employment situation was described as fairly satisfactory.

NEW YORK

Some decrease in manufacturing activity and employment was noted in several major industries. Part-time schedules were general, and some plants closed temporarily. The recession in the automobile and accessory factories curtailed production in the iron and steel mills, foundries and machine shops.

New York city—Plants manufacturing automobile accessories and automobile assembling plants reported a further seasonal recession in production and employment.

Syracuse—Practically all plants curtailed their operating schedules and worked with reduced forces. The steel mills, metal working establishments and the automobile industry reported decreases in activities.

Buffalo—Considerable improvement is expected this month. Production and employment in the iron and steel industry decreased slightly in the last thirty days and the automobile establishments continued on low production schedules. Two automobile assembling plants were practically closed.

Yonkers—The automobile industry operated on a fair production schedule, but with slightly curtailed forces.

Elmira—The seasonal recession in industrial activity and employment was slightly more pronounced than is usual at this time of the year. The automobile industry and plants manufacturing fire engines operated on part time schedules with curtailed forces

NEW JERSEY

There was a seasonal curtailment in industrial activity and some unemployment was apparent in practically all cities. Employment in the metal-working establishments and machinery plants continued on a satisfactory basis. Plants manufacturing automobile accessories and rubber products reported a further recession in production and employment.

Trenton—Production schedules in practically all major industries were curtailed and factory employment decreased. The continued lull in the automobile industry affected operations and employment in the rubber mills.

PENNSYLVANIA

The usual winter surplus of labor was apparent and unemployment among factory workers increased somewhat. Recessions in several industries were regarded as slightly more than seasonal as in plants manufacturing automobile accessories. The majority of the metal-working establishments worked in full time schedules. Part time operations prevailed in many of the iron and steel mills, but early improvement is expected in this industry.

Philadelphia — Operations and employment in plants manufacturing automobile accessories remained seasonably dull.

Pittsburgh—Production and employment in the steel industry decreased somewhat. A gradual increase in steel mill activity is anticipated and an improvement in the employment situation is expected this month.

CUMULATIVE NEW PASSENGER CAR REGISTRATION TABLE, DECEMBER, 1929

Some of this data has been published previously, but it is given here complete for the convenience of our subscribers.

Returns for today: Florida, Minnesota, Missouri, New Hampshire, South Dakota and Vermont

States	Auburn	Black Hawk	Buick	Cadillac	Chevrolet	Chrysler	Cord	DeSoto	Dodge	Durant	Elcar	Erskine	Essex	Ford	Franklin	Gardner	Graham	Hudson	Hupmobile	Jordan	La Salle	Lincoln
Arkansas			3		54	4		2	16	1			3	77								
Delaware	3		20	8	60	5		7	7	8			12	146				4	10		7	
Florida	7		111	9	581	55	2	18	53	3		1	76	1093	3		42	48	26	1	27	1
Illinois	23	3	246	50	542	157	15	65	467	35	8	3	189	1372	31	4	65	123	91	2	67	46
Maryland	4	1	91	16	383	66		32	93	23		1	113	776	2	1	43	35	51		11	1
Minn.		1	47	3	407	37		26	51	41		3	59	771	1		10	17	9		8	1
Missouri	5	2	131	11	598	33	1	26	365	45		4	106	1207	17	3	51	16	42		19	5
Montana			4		24	3		2	2	2			2	40			1		2			
N. Hamp.	1		9		19	5		3	12	5			11	59	3		2	5	1		1	
N. Jersey	5		67	14	136	46	2	17	107	7		2	43	260	5		8	14	26	1	22	5
N. Dakota			1		49	2		1	2	3			2	111			1	1	1			
Rh. Island	4		41	9	59	23	1	31	28	9	2	1	15	88	4		12	5	4		9	2
S. Dakota	2		14		202	8		6	30	11			15	339			7	6	16			
Utah	2	1	4		63	5		8	18	8			19	171	2		7	9	7			
Vermont	1		2		11	3		1	11				6	60			1	2				
W. Va.	4	2	50	4	343	40		32	107	15		3	110	578	4		49	20	26	2	3	3
Wisconsin	2	1	129	13	483	53	4	30	291	23		8	93	852	3		27	49	32	3	16	4
Dis. of Col.	8		32	5	125	28		9	42	8		1	35	319	3		29	13	13	1	6	7
Total...	71	11	1002	142	4139	573	25	316	1702	247	10	27	909	8319	78	8	355	372	357	10	196	75

States	Locomobile	Marmon	Marquette	Nash	Oakland	Oldsmobile	Packard	Peerless	Pierce-Arrow	Plymouth	Pontiac	Reo	Roosevelt	Stearns Knight	Studebaker	Stutz	Viking	Whippet	Willys-Knight	Windsor	Miscellaneous	Totals
Arkansas				2		2				5	2		1					5				177
Delaware			2	9	3	5	6	1	2	7	19				3		1	7	2			364
Florida		4	19	37	8	29	42		10	25	54	12	8		17		2	36	9			2,469
Illinois		8	16	110	41	121	111	15	16	67	102	21	20	2	83	10	8	71	14	12	48	4,500
Maryland		9	23	71	21	39	34	7	6	56	112	22	6		37		2	55	8		1	2,252
Minn.			2	17	17	27	14		1	50	67	1	1		33	1		36	4		2	1,765
Missouri		17	11	51	25	53	41	11	13	56	71	8	9		64		2	98	15	7	1	3,240
Montana			1	4	1	1	1			7	2	1	2		1			3	1		1	108
N. Hamp.		2	1	10		6	2			8	8	5	1		4			4	1			188
N. Jersey		3	2	57	11	35	24	2	13	12	39	4	3		27	2	2	21	9	3	3	1,059
N. Dakota			2	3	5	2				4	16		1		1			11	1			220
Rh. Island			3	17	8	13	6	5	5	10	16	9	1		9		1	10	9		1	470
S. Dakota		1	3	10	8	21				23	14	2	3		10		2	28	2			783
Utah				15	1	8	2			2	16	4			12			1	1			386
Vermont			1	3		1				2	7		1		2			3				118
W. Va.		6	5	47	14	35	15	1		50	46	15	17	1	15	1		44	15		1	1,723
Wisconsin		2	14	114	31	55	24	3	9	43	80	9	2		46	1		45	12		5	2,611
Dis. of Col.		3	6	23	18	24	14	26	6	9	23	4	1		22			8	4		2	882
Total...		55	111	600	212	477	336	71	81	436	694	117	77	3	386	15	20	486	107	22	65	23,315

Figures in this table are from R. L. Polk & Co. of Detroit, with the exception of Illinois, which are supplied by the Robinson Advertising Service, Springfield, Ill., and New Jersey, which are furnished by the New Jersey Motor List Co., New Car Division, Trenton, N. J. Readers desiring county, city or town lists, or lists of owners in any given section, may obtain these by addressing any of these three companies.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

Properties of Gasoline Regarding Vapor Lock Discussed by Bridgeman

"The Properties of Gasoline With Reference to Vapor Lock" were discussed yesterday in a paper presented at the co-operative research session of the annual meeting of the Society of Automotive Engineers by O. C. Bridgeman and Elizabeth W. Aldrich, both of the Bureau of Standards.

The text of this paper as prepared by the authors is presented in part herewith.

THERE is a practical limit to the richness of mixture which it is feasible to supply to the engine in starting. This limit determines the temperature below which starting will not be easy with any given fuel. If starting at lower temperatures is desired, a more volatile fuel is needed. On the other hand, the more volatile a fuel, the greater will be the tendency to boil in the fuel-feed system as the engine warms up. If the fuel boils, then interruption of flow, due to vapor lock, may be expected. These two effects —ability to start the engine and ability to keep the engine running when warmed up—impose limits on the practical operating range of fuel temperatures in the fuel-feed system. This practical range is about 140 degrees Fahrenheit for automobiles and similar motor vehicles.

The property of a gasoline which determines both the starting ability and the tendency to boil is the 10 per cent. point; namely, the temperature at which 10 per cent. of the gasoline is evaporated in the standard distillation test. A fuel with a 10 per cent. point of 140 degrees Fahrenheit would permit an engine in good mechanical condition to be started easily down to temperatures of 0 degrees Fahrenheit. This fuel will boil if heated above its 10 per cent. point, which is 140 degrees Fahrenheit in the present instance. Some fuels containing undesirable amounts of propane may cause vapor lock at temperatures 20 degrees Fahrenheit below the 10 per cent. point, and some poorly designed fuel systems may also result in interruption of flow at temperatures below the 10 per cent. point, due to trapping of gases which come out of solution.

In the case of airplanes, the temperature at which boiling may occur becomes lower as the height from the ground increases, due to decrease in the atmospheric pressure. An allowance must be made for a lowering below the 10 per cent. point of about 2 degrees Fahrenheit for every 1,000 feet altitude above sea level. Thus, for an airplane with a ceiling of 20,000 feet, the practical operating range of fuel temperature is reduced to about 100 degrees Fahrenheit. A still further lowering is desirable if long suction lifts by a fuel pump are involved.

The practical conclusions which have tentatively been reached can be summarized as follows:

1. It is undesirable to use a fuel which has a much lower 10 per cent. point than that required for easy starting at the lowest temperature likely to be encountered. This may make it desirable to use different grades of gasoline for certain types of operating conditions.

2. The temperature of the liquid fuel should not exceed the 10 per cent. point temperature of the gasoline. Fuel lines should be so designed and installed that they will meet this requirement with a reasonable margin of safety for variations in existing fuels.

3. The presence of more than small amounts of propane in the gasoline is undesirable from the standpoint of vapor lock. If gasolines containing much propane are likely to be used, a liberal margin of safety below the 10 per cent. point should be allowed in fixing the maximum operating fuel temperature which is permissible.

These conclusions are based on the work done up to the present time on the various phases of the investigation of vapor lock. The present paper covers all data obtained on the properties of gasolines which affect their vapor-locking tendency. Data have also been obtained on the temperatures at which vapor lock actually occurs in typical fuel-feed systems, both at sea level and at altitude, and a report on the results of these experiments will be presented in the very near future. Temperatures in the fuel lines of several representative aircraft during flight have been measured and arrangements have been made for securing additional values. It is planned to extend this investigation to include the measurement of temperatures in automobile fuel-feed systems.

It is hoped that the work outlined will give much information of value on the design and installation of fuel-feed systems in both airplanes and motor vehicles, and on the types of fuels which are satisfactory for use in existing systems.

Analysis of the Vapor-Lock Problem

Vapor lock is the partial or complete interruption of gasoline flow in the fuel-feed system resulting from the formation of bubbles of vapor or gas. Vapor lock may result when the sum of the pressures exerted by the liquid hydrocarbons, the dissolved gaseous hydrocarbons, dissolved air and water exceeds the external pressure at any point in the fuel system. The higher the temperature of the fuel, the more readily does vapor form under constant external pressure. At a given temperature, lowering of the external pressure favors the formation of vapor. Further, hydrostatic tension, such as occurs in suction lift by a fuel pump, assists vapor formation, whereas hydrostatic pressure, as in gravity feed, retards vapor formation.

Vapor lock cannot possibly occur at any point in the fuel-feed system if the total vapor pressure of the gasoline flowing through the the gasoline dissolved gases and fuel-feed line, including the pressures of dissolved gases and water, is less than the external pressure at each point in the system. If the total vapor pressure does exceed the external pressure at any point, there is the possibility that vapor lock will occur. Whether serious interruption of flow occurs will depend upon (a) the decrease in the total vapor pressure with increase in the size of bubble, (b) the characteristics of the gasoline, (c) the restrictions offered to the elimination of gas or vapor from the fuel line, and (d) possibly to some extent upon other features of the fuel system.

The investigation of vapor lock can therefore be logically subdivided into three phases:—

1. Study of the vapor pressures of gasolines as a function of temperature, including the effects of dissolved gases and dissolved water.

2. Determination of the conditions under which vapor lock actually occurs in typical fuel-feed systems.

3. Measurement of the temperatures existing in representative fuel-feed systems under conditions of operation.

The first phase gives the predicted conditions under which a given fuel theoretically can cause trouble from vapor lock. The second phase gives the actual conditions under which this gasoline does interrupt fuel flow in typical feed systems. Although this second phase of the investigation is still in progress, the results to date show remarkable agreement between the predicted limiting conditions and those actually found in the flow experiments to cause vapor lock. The third phase gives information on the types of fuel necessary to insure freedom from vapor lock in existing fuel systems.

The present report covers the first phase of the vapor lock investigation. Data are presented on the gas-free vapor pressures of forty-three fuels over a range of temperatures. These include two benzene blends, five pentane blends, four butane blends and twelve propane blends. Results obtained in the study of the solubility of propane, air and water in gasoline are given, and their effect on the vapor-locking tendency of a fuel is pointed out. Values for the ethane and carbondioxide content of a number of gasolines are also included. General conclusions are presented regarding criteria for the evaluation of the tendency of a gasoline to give trouble from vapor lock.

The Vapor Pressure Problem

From the standpoint of vapor lock, it is desired to know the total vapor pressures of gasolines as they are in the fuel-feed system at the instant when bubble formation occurs and with various sizes of bubble. Three methods are available, namely:—

1. Use of one of the industrial vapor pressure methods.

2. Measurement of the vapor pressures of the gasolines, without removal of any constituents, at various temperatures and with various volumes of vapor space.

3. Measurement of the vapor pressures of the gasolines, after removal of dissolved gases and dissolved water, at various temperatures and with various volumes of vapor space, followed by a study of the effect of dissolved gases and water on the gas-free vapor pressures thus measured.

The first method was not adopted because (a) there were no criteria regarding the absolute accuracy of the industrial methods, (b) the effect on the results of the large vapor space employed was not known, and (c) there were certain limitations to their use for the study of the effects of temperature and volume of vapor space. The second method likewise was not adopted for the reason that all gasolines stored at a given temperature in contact with the atmosphere have a total vapor pressure, with a small bubble present, equal to that of the atmosphere at this temperature, regardless of their composition or differences in other respects. Hence, although a series of gasolines might show different total vapor pressures at temperatures other than that of storage and at different volumes of vapor space, the data so obtained would be inherently difficult to interpret. Accordingly, the third method outlined above was adopted.

The vapor pressure problem, therefore, resolves itself into a study of the pressures exerted individually by various constituents or various groups of constituents present in the gasolines. For this purpose, a gasoline may be subdivided into (a) liquid hydrocarbons, including propane; (b) propane; (c) ethane; (d) methane; (e) air; (f) carbondioxide, and (g) water. Since propane is on the border line between a liquid and a gas, it is included in both (a) and (b). Although methane is listed as a possible constituent of gasolines, analyses showed that no detectable amount was present in any one of a considerable number of fuels investigated, and hence no further consideration was given to the effect of methane. With this exception, data obtained on all of the constituents enumerated above are considered in the order listed.

[The paper then goes into a mathematical discussion of vapor pressures.—Ed.]

USED CAR ORDERS ON FILE HIS PROBLEM

VAAST BROTHERS, Cadillac-La Salle dealership in Norwalk, Conn., has a used car problem that rather differs from the usual. The concern now has on its books standing orders for five used La Salles and one Cadillac which to date it has been unable to fill, according to Jules W. Vaast.

The total number of used cars of other makes now on hand is but eight, as against twenty-eight last year, Mr. Vaast says. Keeping customers satisfied is cited by Mr. Vaast as the chief reason for his concern's success in both new and used car fields. Twenty-four hour service is maintained in the company's new plant on Connecticut Avenue.

Developments in Methods Of Cold Carburetion to Be Outlined to S. A. E. Today

(Continued from Page 8)

schemes, the latter solution seemed preferable. Acceleration was attempted also by spraying fuel into the main airstream at the carbureter. This functioned fairly well in warm weather, but failed at extremely low temperatures on account of the poor distribution of the accelerating fuel. This was equivalent to the conventional means of accelerating with the usual carbureter, and was about as successful as the conventional carbureter would be without heat.

If the main-mainfold throttle is held closed and the primary throttle is opened suddenly, the velocity in the small-diameter tubes is sufficiently great to carry the fuel with the air under cold temperatures. The diameter of the primary tubes is determined by this low-temperature condition. The main throttle can then be opened slowly at a rate to afford the correct mixture ratio at the cylinders, this being provided by the automatic throttle-valve located on an off-center shaft between the engine and the main throttle and which opens under the pressure of air against it. The automatic throttle is connected with a dash-pot in the fuel bowl which controls the speed of opening. At low engine-speeds it opens rather slowly, because of the small amount of air required by the engine; but when the accelerator is opened suddenly at high speeds, the automatic throttle opens very rapidly. The time-lag caused by the automatic throttle at high speeds is of such short duration that no appreciable time is lost in acceleration, and it prevents the sudden jerk experienced upon kicking open the accelerator of a conventional carbureter.

Fig. 5 shows a six-cylinder manifold in which the primary tubes are cast with the manifold. The tubes are flattened to avoid the possibility of loading by having fuel collect in the bottom.

Effort Concentrated on Overhead-Valve Engine

Application of the cold-carbureter system to an engine, as illustrated in Fig. 6, is comparatively simple because no connection is made with the exhaust manifold; in fact, considerable separation of the exhaust manifold from the intake system is desirable, to keep the intake-air temperature low and thereby obtain the greatest power gain.

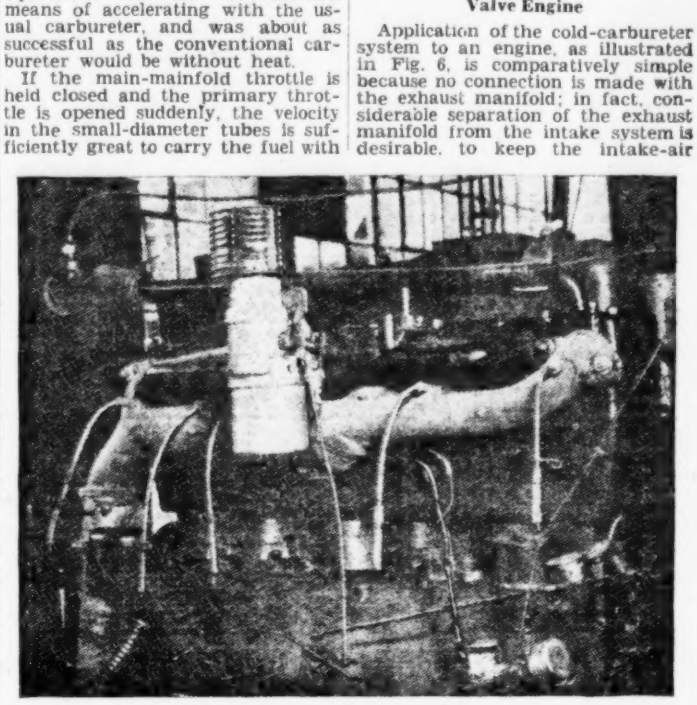


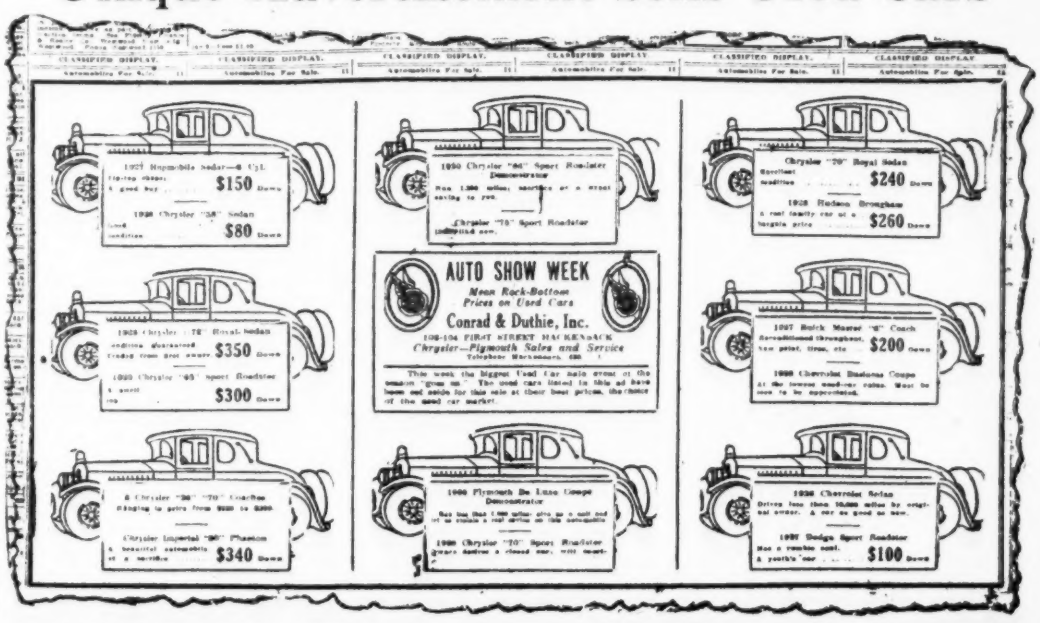
FIGURE 7—Cold-carburetion system as applied to an engine used for laboratory tests

Experiments were conducted on both L-head and valve-in-head engines. Some difficulty was experienced with loading in the L-head-engine valve-ports, because the liquid fuel collected at low open-throttle speeds. Although this trouble was overcome, certain complications were necessitated. The more favorable results obtained on overhead-valve engines resulted in the concentration of effort on them and in temporary cessation of work on the L-head design.

It is difficult to predict what the final result of this development will be. The system of cold carburetion involves some difficult problems, but the advantages are so great that cold carburetion should soon become commercial practice.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRINGS RESULTS

Unique Advertisement Sells Used Cars



A SIX-COLUMN classified display ad, impressing on the motoring public that automobile show week means rock bottom prices on used cars, aided Conrad & Duthie, Inc., Chrysler-Plymouth dealer, 102-104 1st St., Hackensack, N. J., in disposing of a large number. The advertisement, reproduced here, was unique in that the individual car descriptions appeared as a tag with a drawing of a coupe as a background. Descriptions of the cars on sale appeared with the amount necessary for down payment

S.A.E. Hears Shepard's Paper on Downdraft Carburetion

E. H. Shepard, chief engineer of the Holley Carburetor Company, Detroit, is presenting today at the engine session of the Society of Automotive Engineers at the Book-Cadillac Hotel, Detroit, the accompanying paper on "Downdraft Carburetion."

HAVING the carburetor mounted on top of the intake manifold is no novelty, for there are many examples of such an application in automobile engineering, some of which date back more than twenty years. We have, however, for the most part, used updraft carburetors, or, as they are usually termed, vertical carburetors, in the majority of automobile designs. The basic reason for this, no doubt, has been the type of the fuel-supply system, as most car designs for nearly twenty years included a vacuum tank as a part of the fuel-feed system, and the carburetor float bowl was filled by gravity from this tank. This made the location of the carburetor below the intake manifold a necessity if sufficient head was to be obtained on the float bowl.

During the last three years a great change has been made in fuel-feed systems, and vacuum tanks are almost the exception rather than the rule. In their stead has come a pressure feed supplied by a mechanical pump operated from some engine shaft. With this development, the possibility of putting the carburetor on top of the manifold came to the minds of many designers. This

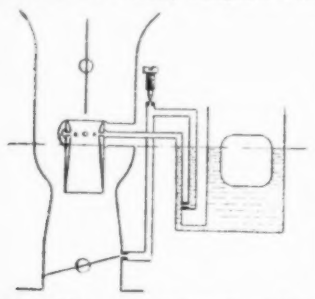


FIGURE 1—Diagrammatic sketch of a conventional inverted carburetor. With open-throttle conditions, a lineal air-velocity of about 2,600 feet per minute through the venturi is needed to raise the fuel above the level in the float-chamber and cause sufficient fuel-flow for full engine power.

may have been hastened by the use of inverted carburetor on a few racing cars, which seemed to be faster than similar cars that had updraft carburetors. At any rate, considerable interest in the subject is being shown throughout the automotive industry, and I shall try to explain some of the results that may be expected from development of this type of carburetor.

There are cases in which a downdraft carburetor is almost a necessity, as the only available space for carburetor installation is above the engine. In some such instances it may not be imperative to secure maximum engine performance, and for this sort of application one may select from three or four makes of carburetor.

Demand for downdraft carburetion has swept through the marine field in the last year and a half, ever since the Holley Carburetor Company equipped the Scripps 200-horse-power engine with its radically different type of downdraft carburetor. This same type will be used by almost all of the leading marine engine manufacturers this coming season.

Let us see wherein this carburetor differs from the conventional carburetors.

Fig. 1 shows an inverted carburetor of the conventional type, such as has been available for ten or twelve years. Observe that the point at which the fuel joins the air stream in the venturi is above the fuel level in the float chamber, necessitating considerable velocity of air to assure a flow of fuel from the jet orifices. This velocity is rather higher than one might suspect; in fact, with open-throttle conditions, a lineal velocity of approximately 2,600 feet per minute is required to cause a flow sufficient for full power.

In an updraft carburetor, when the air velocity past the jet falls to around 2,000 feet per minute, fuel is drawn from the jet, but the velocity of air is not sufficient to carry all the fuel thus emerging from the jet into the engine and some of it runs out of the air entrance of the carburetor and is not available for use in the cylinders. Under identical air-flow conditions, with the conventional inverted carburetors, the fuel drawn from the jet falls into the manifold and is carried on into the engine, so the results compare very favorably with updraft practice. Examples of such downdraft installations are the Chrysler and Hupmobile designs.

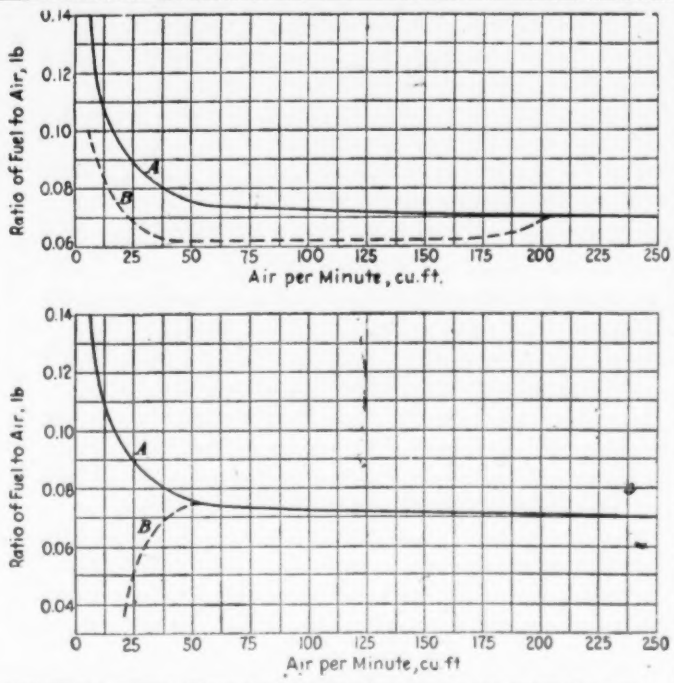


FIGURE 2—(Top) Characteristic fuel-flow from a jet below the float-chamber fuel-level controlled at part-throttle by a needle. Curve A, of fuel-air ratio plotted against air volume per minute, follows an almost straight line over the major part of the range corresponding to wide-open-throttle operation, with a tendency toward richness at the lower end, which improves the flexibility of engine operation. Curve B shows how this characteristic fuel-flow is altered and a progressive throttle-range mixture obtained by means of a needle in the jet, which increases the orifice area as the throttle is opened

FIGURE 3—(Bottom) Full-throttle mixture-ratio curves of a conventional and a needle-controlled updraft carburetor. Curve A is the same as in Figure 2, and Curve B shows the flow of a conventional updraft carburetor at full-open throttle. At low speed and open throttle a carburetor having the A characteristic gives good performance, whereas one having the B characteristic supplies too lean a mixture at an air-flow below twenty cubic feet per minute, corresponding to 2,330 lineal feet per minute through a 1¼-inch venturi

Principles of Holley Carburetor

Let us now examine the construction of and the principles involved in this radically different type of downdraft carburetor, as made by Holley, to see how the fundamentally correct flow from a jet the outlet of which is below the fuel level has been harnessed to give a very flexible, wide-range carburetor, which starts easily, accelerates positively and has become popular with the marine engine manufacturers in so short a time.

A fact which has been known for years is that a carburetor jet the outlet of which is below the fuel level has a flow characteristic that follows the engine requirements at all speeds for wide-open-throttle operation. Fundamentally, all air-bled jet carburetors are intended to use this principle, but, owing to lack of fuel flow when suction is insufficient to cause air to bubble through the fuel, the characteristic flow ceases and the jet becomes subject to the laws governing the flow of simple nozzles, which have been found to require an air velocity past the nozzle of approximately 1,500 feet per minute to start fuel flowing from the nozzle.

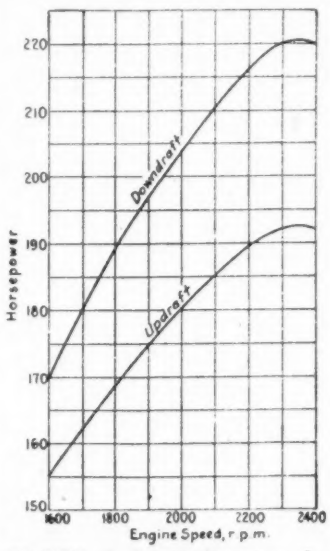


FIGURE 4—Power increase obtained with a wide-range downdraft carburetor and correct manifolding. This increase, which is over the whole operating range, is obtained without sacrifice of engine flexibility. This is accomplished largely by increasing the volumetric efficiency through the use of larger manifolds and a carburetor having a greater air-flow capacity and by a reduction of hot-spot area.

Referring to Fig. 2, curve A shows the characteristic flow of a jet the outlet of which is below the fuel level. We have plotted the fuel-air ratio, by weight, against cubic feet of air per minute. This follows an almost straight line over the major portion of the range corresponding to wide-open throttle operation, with a tendency toward richness at the lower end, a fact which considerably improves the flexibility in operation of the engine and has no objectionable feature.

For the progressive throttle range a taper needle is inserted in the jet and connected to the throttle so that as the throttle is opened the needle lifts out of the jet and increases the area of the orifice. The relation of this needle to the throttle is the idle-mixture adjustment, and, incidentally, is the only adjustment on the carburetor. The construction is so arranged that beyond three-quarter throttle opening the taper needle is lifted clear out of the jet and allows its fundamental characteristic, as shown in curve A, to function. Curve B in Fig. 2 shows how the taper needle alters this characteristic and enables us to secure any desired progressive throttle mixture without in any way affecting wide-open throttle conditions.

In Fig. 3 at B is shown the full-throttle mixture-ratio curve of a conventional updraft carburetor of 1½-inch nominal size when such a carburetor has been "opened up" to have an air flow comparable with the radically different type we have been discussing. The curve A will be recognized as that shown in Fig. 2 and it will readily be seen why a carburetor having such a characteristic will perform at low speeds and open throttle, whereas a carburetor having the characteristic shown at B is lacking in jet flow below an air flow of twenty cubic feet per minute, which corresponds to 2,330 lineal feet per minute through a 1¼-inch venturi, and the mixture becomes too impoverished to ignite.

Fig. 4 shows the average increase in power obtained, without the sacrifice of flexibility, by the installation of one of these wide-range downdraft carburetors with proper manifolding. Note that the increase is over the whole range; not only at the top end, as might be expected. This improvement in power is accomplished largely by increasing the volumetric efficiency through the use of larger manifolds, a carburetor that has a greater air-flow capacity, and a reduction in hot-spot area, which reduces the mixture temperature considerably below usual practice. In many cases this temperature is approximately the same as that of the air entering the carburetor when the engine is developing the maximum horse power.

A diagrammatic drawing of this new and different downdraft carburqetor is given in Fig. 5. Observe that the nozzle outlet (a) is below the fuel level in the float chamber. At (b) is a metal diaphragm, controlled by oil pressure from the engine, which closes valve (c) and stops the fuel flow whenever the oil pressure falls below ten pounds per square inch, thus preventing any leak when the engine is not running. Obviously, no oil pressure is available when starting from cold; however, provision has been made so that when the choke is closed a needle (d) is opened and fuel is transmitted by suction direct from the float chamber to the mixing chamber and thence to the manifold.

Large-Area Manifold Advantageous

Some question has been raised regarding correct manifolding for these carburetors. Our experience has shown that the cross-section area of the manifold branch can be 50 per cent. larger than the actual valve opening and that distribution is easier to obtain with downdraft carburetors and such a manifold than would be possible with updraft carburetors and a similar manifold cross-section.

Furthermore, with downdraft carburetion it is possible to arrange the hot spot so that the fuel falls by gravity onto the heated surface which preferably takes the form of a shallow pocket, making unnecessary the heating of the air portion of the charge by surrounding the manifold with a heat jacket, except for rapid warming up.

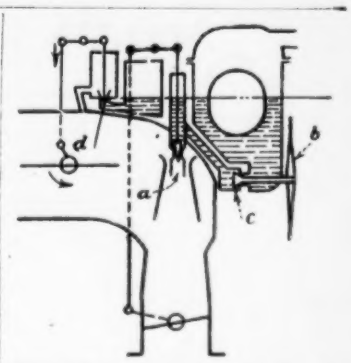


FIGURE 5—Diagrammatic sketch of downdraft carburetor in which nozzle outlet is below fuel level. a, nozzle outlet; b, metal diaphragm controlled by oil-pressure from engine; c, valve to stop fuel-flow when oil pressure drops below ten pounds per square inch; d, needle connected with choke for starting cold.

In starting a cold engine, the heavy fuel goes to the bottom, leaving a large area above for the transmission of an atomized charge from the carburetor to the inlet valve, as shown in Fig. 6. The space above the solid fuel can be utilized until the manifold becomes well filled with liquid fuel. A start should be made before the manifold does fill up, our experience being that, with our system of having a starting-jet supply separate from the normal running jets, correct starting-mixture proportions are readily available and we are able to secure positive starting in a few seconds. With an upiraft carburetor, any atomized fuel has to be bubbled through a mass of liquid gasoline unless the engine starts instantly, for in ten seconds of cranking at low engine revolution the carburetor and riser fill up with liquid fuel.

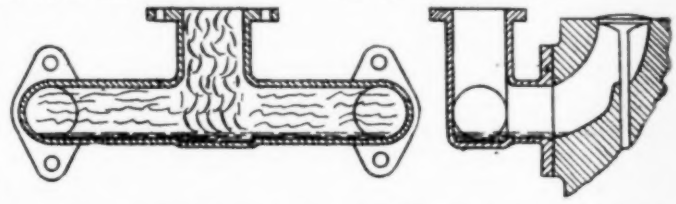


FIGURE 6—Large-diameter manifold for downdraft carburetor. When starting a cold engine, liquid fuel collects at the bottom, but a large space transmits an atomized charge from the carburetor to the inlet valve. The atomized fuel does not have to bubble up through liquid fuel as with an updraft carburetor.

Downdraft Carburetion Topic of S. A. E. Session

(Continued from Page 9)

relate empirically, by means of analytical research, the experimental results obtained by different investigators and to establish certain underlying principles common to all such tests in which the frictional resistance depends primarily upon fluid shear.

The conclusions arrived at are predicated upon a rather wide range of reported determinations, including most of the relevant tests that have found their way into friction literature during the last fifty years. In piecing together this accumulated experience, along the lines suggested some years ago by Prof. M. D. Hersey, a reasonably reliable but relatively simple method for predetermining certain kinds of friction losses has been deduced.

Mr. Shepard, in his paper on "Downdraft Carburetion," points out that the general adoption of pressure fuel-feed systems on automobiles in the last three years turned many designers' thoughts to the desirability of placing the carburetor on top of the manifold.

"The idea was not new," he says, "as examples of such application date back more than twenty years. The recent development may have been hastened by use of inverted carburetors on a few racing cars; moreover, in many cases the only available space for the carburetor is above the engine. In the last year and a half a demand for downdraft carburetion has swept through the marine field and, according to the author, almost all leading marine-engine manufacturers will use downdraft carburetors this coming season.

"Updraft and inverted carburetors in which the point at which the fuel joins the air stream is above the fuel level in the float chamber require a high air flow velocity to assure a flow of fuel from the jet orifices and to carry all the fuel into the engine."

In the radically different type of downdraft carburetor illustrated and described in Mr. Shepard's paper, the fuel outlet is below the fuel level so that the carburetor has a flow characteristic that follows the engine requirements at all speeds for wide-open-throttle operation. In addition, a taper needle in the jet is connected to the throttle to increase the area of the orifice as the throttle is opened, enriching the mixture progressively. This needle alters the characteristic curve of mixture ratio for low air-flow velocity and closed-throttle operation.

Comparative horsepower curves, presented by Mr. Shepard, show an increase of 10 to 13 1-3 per cent. over the whole range of engine speed from 1,600 to 2,300 r.p.m. by the use of the downdraft carburetor, as compared with the updraft type. This results largely from increasing the volumetric efficiency through the use of larger manifolds, increased air flow through the carburetor and reduction in the hot-spot area.

The general session tomorrow evening will be presided over by W. R. Strickland, 1929 president of S. A. E., and will be addressed by Alfred Reeves, general manager of the National Automobile Chamber of Commerce, who will speak on "What 1930 Offers to the Motor Industry." Mr. Reeves' address will be based on the business and financial outlook for the industry, and at the close of his talk he will answer questions related to the industry.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRINGS RESULTS

Range of Automotive Stocks: Financial News

MONDAY, JANUARY 20

NEW YORK STOCK EXCHANGE

Previous 1929-1930 High	Low	Div.		Sales	High	Low	Close	Net Change
104⅞	7	....	Advance Rumely ...	2,400	14	14	14	+ 1¾
31	22	....	do pf		No sales today			
223⅜	77	3	Air Reduction	1,500	125¾	123¾	125	+ 1⅛
11¼	1	....	Ajax Rubber	500	2⅛	2	2	— ⅛
75½	35⅛	3	Allis Chalmers	1,100	52¾	52	52¾	+ 1½
76½	27	....	Am. Bosch Magneto.	1,000	42⅜	41½	42⅜	+ ⅛
95⅞	7¼	7	Amer. Chain pf.		No sales today			
8⅝	2¼	....	Am.-La France	400	2¼	2	2¼	....
314	120	4	Auburn	500	182	180	181	+ 1
104⅜	25	2	Bendix Aviation ...	2,700	34	33⅛	33¾	....
136¾	37	3	Bohn Aluminum	300	50⅞	50¼	50¼	— ¼
86⅞	26	4	Borg-Warner	200	35	35	35	+ ¾
63⅛	8½	....	Briggs Mfg. Co.	1,900	15	14⅝	14⅞	+ ⅜
23⅞	21¼	2	Briggs & Stratton ..		No sales today			
16¼	13	....	Brockway Motor ...		No sales today			
22⅞	8⅛	1	E. G. Budd Mfg. ...	200	10	9½	9½	— ½
12½	7¾	1	Budd Wheel	600	9¾	9¾	9¾	+ ⅞
54¾	25	1.60	Bullard	900	33	31	33	+ 3
61	50¼	3	Caterpillar Tractor..	100	57½	57½	57½	— ¼
47½	21⅞	....	Chicago Pneu. Tool.	100	22½	22½	22½	— ½
28¾	27	3	Chicago Yellow Cab		No sales today			
135	26	3	Chrysler Corp.	14,700	35	34	34½	— ¼
61⅞	25	3	Clark Equipment ..	100	33	33	33	— 1
62⅝	18	2	Commercial Credit..	500	26¼	26	26⅛	— ⅛
105¾	70	6.50	do 6½s pf.	80	77⅛	77⅛	77⅛	+ ⅞
79	28⅛	1.60	Comm'l Invest. Trust	400	37	36⅛	37	+ ⅜
99	87	6.50	do 6½s pf.	200	91	91	91	....
28⅜	5⅝	....	Continental Motors.	500	6½	6⅜	6½	....
80	66	3.50	Cutler-Hammer		No sales today			
231	80	4	Du Pont	4,100	115¾	114	115⅝	+ 1¼
76¾	18	3	Eaton Axle & Spring	1,200	30½	29¾	30	+ ¼
174	50	6	Electric Auto-Lite .	1,300	84½	83	84½	+ 1½
104½	55	5	Electric Stor. Battery	400	71¾	71	71¾	+ ¾
22½	3¼	....	Emerson Brant		No sales today			
73⅜	15	2.50	Evans Auto Load ...	300	19	18½	19	....
8	7⅜	.80	Federal Motors		No sales today			
37	24½	1.60	Firestone	100	31	31	31	....
89⅝	83½	6	do pf.	1,300	83⅝	83	83	— ⅞
20⅛	2⅛	....	Fisk Rubber	1,700	3¼	3⅛	3⅛	— ⅛
72½	8	....	do 1st pf.	20	15½	14¾	14¾	— ¾
33⅞	5	....	Gabriel Snubber ...	200	6⅜	6⅜	6⅜	+ ¼
403	168⅛	6	General Electric ...	4,600	247	243¼	245¾	+ 1
4½	3½	....	Gardner Motor		No sales today			
91¾	33¼	3	General Motors ...	25,400	39⅝	38¾	39⅜	....
126½	112	7	do 7s pf.	300	118	118	118	....
64⅛	26	2	Glidden Co.	1,100	31½	31	31½	+ ⅛
102	98½	7	do pf.		No sales today			
105¾	38¼	4	Goodrich	900	42¾	42	42½	+ ½
96⅝	95⅝	7	do pf.		No sales today			
154½	60	5	Goodyear T. & R. .	1,300	64	63	63½	+ 1
104⅞	86	7	do pf.	200	93¾	93¾	93¾	+ ⅛
54	7⅜	....	Graham-Paige Motor	900	9⅝	9¼	9⅝	....
68⅜	5½	....	Hayes Body	1,100	7¾	7⅛	7¼	— ⅝
52⅜	13	2	Houdaille-Hershey ..	33,000	24⅜	22¾	24	+ 1⅝
93½	38	5	Hudson Motor Car..	3,100	55⅞	54⅝	55½	+ ¼
82	18	2	Hupp Motor Car ...	2,100	21½	20⅝	21	....
32½	3½	....	Indian Motocycle ...	1,700	5⅞	5¼	5⅝	— ⅜
5⅜	4¼	....	Intercon. Rubber ...		No sales today			
142	65	2.50	Interna. Harvester ..	1,100	81⅛	80¼	81	+ ⅞
145	137	7	do pf.	100	141½	141½	141½	....
242¾	90	3	Johns-Manville	10,900	127½	124¼	127	+ 1
16½	1½	....	Jordan Motor Car....	200	2¼	2¼	2¼	+ ⅛
24	3	....	Kelly-Springfield ...	200	4⅝	4½	4½	....
36	29	....	do 6s pf.		No sales today			
24⅜	20⅛	....	do 8s pf.		No sales today			
59¾	18⅝	2	Kelsey-Hayes Wheel.	400	23¾	23⅝	23¾	....
8½	6⅛	....	Lee Rubber & Tire..		No sales today			
41	39	2.60	Link Belt		No sales today			
114⅜	55¼	6	Mack Trucks	400	71	70½	70½	+ ¼
42½	39⅞	6	Marlin Rockwell		No sales today			
104	19	4	Marmon	1,600	23	21⅞	21⅞	+ ⅞
3½	3	....	Martin Parry		No sales today			
34⅞	9	2	Mengel	100	16	16	16	....
28⅞	3¼	....	Miller Rubber	600	4⅜	4⅛	4¼	— ¼
5¼	3⅞	....	Moon Motors		No sales today			
31⅜	3¼	....	Moto Meter G & E..	500	5⅛	5	5¼	+ ½
142	36	2	Motor Products	100	58	58	58	....
55⅛	21	3	Motor Wheel Corp. .	500	27	26⅝	27	+ ⅛
18⅞	12⅞	....	Mullins Mfg.		No sales today			
100⅞	14⅞	3	Murray Corp.	1,900	19	18½	18¾	+ ⅞
118⅞	40	6	Nash Motors	1,900	52¼	51¼	52	— ¼
6¼	¾	....	Norwalk T. & R. ...		No sales today			
45	8	....	do pf.		No sales today			
3⅜	2¾	....	Omnibus Corp.		No sales today			
33⅜	30½	2.50	Otis Steel		No sales today			
32½	13	1	Packard Motor Car.	10,500	15⅞	15⅜	15⅝	+ ⅛
22½	5⅛	....	Peerless Motor Car..	500	7½	7¼	7½	....
26	21½	....	Pierce-Arrow		No sales today			
37½	17¾	6	do pf.		No sales today			
58½	28	2.60	Raybestos Manhattan	1,600	36¼	35	36¼	+ 1
31⅞	10⅛	.80	Reo Motors	300	11⅛	11	11⅛	+ ⅛
12¼	3⅝	....	Reynolds Spring ...	500	4	4	4	....
66⅜	20⅛	....	Spicer Mfg. Co.	300	25	24	25	— ½
58⅞	38¼	3	do pf.		No sales today			
77	30	3.50	Stewart-Warner Spd.	400	39⅛	38¾	39	+ ¼
98	38¼	5	Studebaker Co.	2,000	42⅞	41¾	42	— ¾
126	115	7	do pf.		No sales today			
34⅜	11½	.60	Timken Detroit Axle	700	14⅝	14½	14½	— ⅛
139⅜	58	3	Timken Roller Bear.	5,400	74¾	72	73½	+ 1¼
34¼	30⅜	2.50	Trico		No sales today			
65	15	....	U. S. Rubber	3,400	23¼	22¼	22⅝	— ⅜
92½	40⅛	....	do 1st pf.	500	49½	49¼	49¼	+ ½
42⅞	15	2	Warner Quinlan	200	19¼	19⅛	19⅛	+ ¼
67¾	36½	2	Westinghouse A. B. .	200	44⅜	44⅝	44⅜	....
32¼	31	2	White Motors		No sales today			
61¼	19	2.50	Wilcox Rich A	200	29½	28¼	28¼	— ½
62	12⅜	2	do B	300	20	20	20	....
35	5¼	1.20	Willys-Overland	3,200	8⅝	8	8½	+ ⅜
80¼	67	7	do pf.		No sales today			
75½	75	4	Yale & Towne		No sales today			
14⅞	12¾	....	Yellow Tr. & C. B .	1,400	13⅞	12⅞	13	— ¼
96½	80	....	do pf.		No sales today			

NEW YORK CURB EXCHANGE

Sales		High	Low	Close	Net Chge
11300	Cities Service...	28¼	27⅞	28¼	...
	do pf	No sales today			
	Con Di Fibre...	No sales today			
200	Cord Corp	11⅜	11⅛	11¼	+ ⅛
1100	Doehler D C...	18¾	18⅛	18⅜	— ⅛
200	Durant Motor..	5	5	5	+ ⅛
	Fageol Motor...	No sales today			
	Fedders	No sales today			
	Federal Mogul..	No sales today			
300	Federal Screw..	34½	34½	34½	— ½
1100	Fiat	17⅞	17¾	17⅞	— ⅛
500	Ford Canada...	30¼	30	30¼	+ ¼
800	Ford France....	6⅜	6½	6½	— ⅛
2100	Ford Ltd	10⅞	10½	10½	...
	Franklin Mfg ..	No sales today			
	Gen T & Rub..	No sales today			
	Grn'f'ld T & D.	No sales today			
	Hall Lamp	No sales today			
	Henney	No sales today			
	Hood Rubber...	No sales today			
	India Tire	No sales today			
	Isotta Fras	No sales today			
	Jaeger	No sales today			
100	Lakey	9	9	9	+ ⅛
	McQuay Norris.	No sales today			
	Midland Steel...	No sales today			
	Nat. Rub Mach.	No sales today			
400	Paramount Cab.	12⅞	12½	12¾	— ½
	Perfect Circle..	No sales today			
	Pines Winter...	No sales today			
	Pitt Pl Glass...	No sales today			
	Rolls Royce Am	No sales today			
	Ross Gear	No sales today			
	Safe T Stat....	No sales today			
	Seiberling	No sales today			
10	Smith A O.....	145	140½	140½	—9¼
	Sparks With....	No sales today			
200	Stutz Motor ...	7½	7½	7½	— ¼
	Thermoid Co	No sales today			
100	Triplex	7½	7½	7½	+ ⅛

NEW YORK OVER-THE-COUNTER

Div.		Bid	Asked
6	Am Hard Rubber.....	58	62
8	Dixon (J) Crucible.....	165	172
3.50	Doehler Die Casting.....	32	..
7	do pf	75	..
....	Eismann Magneto	29	30
7	do pf	89	99
....	Rolls Royce Am.....	10	15
....	do pf	15	25
....	Splitdorf Beth Elec.....	3	4

CHICAGO STOCK EXCHANGE

Sales		High	Low	Last
30	Acme Steel	93	93	93
350	Allied Motor Ind...	16	15½	16
150	Allied Products	36	36	36
350	Auburn Auto	180	178	178
1850	Bendix Aviation ...	33¾	33⅛	33⅜
1200	Borg-Warner	35	34½	35
1550	Cord Corp	11⅜	11⅛	11⅜
2300	Houdaille Hershey A	26	24⅜	25⅛
9200	do B	24¼	22¾	23⅜
100	Modine	52½	52½	52½
200	Muskegon M S.....	16½	14	14½
100	Pines Winterfront..	39	38	39
550	Ross Gear	33	30¼	33
170	Van Sicklen	17¾	17	17¾

CLEVELAND STOCK EXCHANGE

Sales		High	Low	Last
60	Firestone T & R pf	83½	83½	83½
23	General Tire pf....	90	90	90
200	India Tire	10	8½	8½
60	Miller Rubber pf...	32	31	32
5	Mohawk Rubber....	9	9	9
30	Ohio Brass pf.....	111¾	111¾	111¾
30	Seiberling Rubber..	13⅞	13⅝	13⅝

DETROIT STOCK EXCHANGE

Sales		High	Low	Last
100	Alloy Steel	7⅞	7⅞	7⅞
100	Bower Rubber B....	9	9	9
100	Federal Screw	35	35	35
295	Hall Lamp	13⅞	13¾	13¾
650	Houdaille Hershey A	25½	24⅞	25½
3210	do B	24	22¾	24
365	Jackson M S.....	9½	9½	9½
100	Muskegon P R....	29¼	29¼	29¼
140	Pittsburgh Forge ...	14	14	14
334	Packard	15½	15½	15½
325	Timken Detroit Axle	14¾	14¾	14¾
335	Universal Products.	19¾	19¾	19¾

SCRAP METALS

	Buying	Selling
Aluminum—		
Cast scrap	13 —13½	15 —15½
Sheet scrap	13½—14	15¼—15¾
Clippings	16½—16¾	18½—19¼
Copper—		
Heavy mach. comp.	10¾—11¾	12 —12½
Heavy and wire....	13½—13¾	14¼—14⅝
Light and bottom..	12 —12⅛	12⅜—13
Auto radiators	8¼— 8½	9 — 9⅛
Heavy cut and cruc.	13½—13¾	14¾—15
Brass, heavy	9 — 9⅛	9½— 9⅜
Brass, light	7⅜— 7½	8 — 8⅛
No. 1 cl. brass turn.	9¼— 9½	10 —10½
No. 1 comp. turn...	10 —10⅜	10½—11
Lead—		
Tea lead	2 — 2½	3⅝— 3¾
Lead, heavy	4¼— 5	5⅜— 5⅝
Stereotype	6 — 6¼	6⅞— 7⅛
Electrotype	4⅜— 4½	5¼— 5½
Battery lead	2⅛— 2⅜	2⅞— 3
Mixed Babbitt	4½— 5	5⅛— 6⅜
Zinc—		
Zinc scrap	3⅛— 3⅜	3¾— 3⅞
New zinc cuttings..	4 — 4½	5⅛— 5¼
Tin—		
Block tin, scrap....	34⅝—35¼	35¾—37½
Siphon tops	22¼—22½	25 —25¾
Tinfoil, pure	24⅛—25½	26⅛—28¼

OUTSIDE CLOSING PRICES

(Per pound, delivered New York)

Plantation—	Bid	Asked
Ribbed and smoked sheets, spot	14⅜	15
January	14¾	15
February	14⅞	15⅛
March	15	15¼
April-June	15½	15¾
July-September	16	16¼
Spot—		
First latex	15½	15¾
Thin pale latex.....	15⅜	15⅞
Clean thin brown crepe.....	13	13¼
*Specky crepe	12⅝	13
Rolled brown crepe.....	9⅜	9⅝
No. 2 amber.....	13⅜	13⅝
No. 3 amber.....	13⅛	13⅜
No. 4 amber.....	12¾	13
*Paras—		
*Up-river, fine, spot.....	16¼	16½
do coarse	8¼	8½
*Accra, fine, spot.....	16½	16¾
*Caucho ball—Upper	8	8¼
Centrals—		
*Esmeraldas	8¼	..
*Central scrap	8¼	..
Guayule, washed and dried..	..	14
†Balata—		
*Block Ciudad	41	42
*Surinam sheet	51	52
*Manaos block	45	46
Peruvian block	16	18½

RUBBER

RUBBER EXCHANGE OF NEW YORK

	High	Low	Close	Prev. close
January	14.60	14.50	‡14.60	15.10
February	....	....	*14.80	15.40
March	15.30	15.00	‡15.10	15.60
April	....	....	*15.20	15.80
May	15.80	15.40	15.40a	15.50 16.10
June	15.80	15.80	*15.60	16.30
July	16.20	15.80	‡15.90a	16.00 16.50
August	....	....	*16.10	16.60
September	16.50	16.20	‡16.30	16.80
October	16.60	16.40	*16.50	17.00
November	16.50	16.50	*16.60	17.20
December	17.10	17.00	*17.80	17.40
Spot	....	....	*14.70	15.30
Sales (tons)	.....	.....	1,662½	700

Transferable notices, 40; so far, 635.
Market closed steady.
*Nominal. †Trading. ‡Bid.

WHITE MOTOR COMPANY HAS NO FUNDED DEBT

In the issue of the Automotive Daily News for January 10, 1930, it was stated that the White Motor Company had a funded debt of $2,400,000. As a matter of fact the balance sheet of the company does not show any funded debt and the funded debt of this amount is on the books of the company's subsidiary, the White Motor Realty Company rather than in the records of theparent company.

LUBRICATING OILS

All prices cooperage f. o. b. New York.

(1-inch immersion test.)

Filtered D, 600	44	—	45½
Filtered E, 600	38	—	40½
Unfiltered, 600 S. R.	32½	—	35
Unfiltered, 650 S. R.	37½	—	40
600 Flash, S. R.	40	—	42½
630 Flash	42½	—	44½
Bright stock	51	—	52½

RED ENGINE OILS

(Viscosity at 100.)

300	No. 6½ color.....	20	—	21
250	No. 6 color.....	18	—	20
200	No. 6 color.....	16	—	17

PALE ENGINE OILS

(Viscosity at 100.)

230	No. 3¾ color.....	20	—	21
180	No. 2¼ color.....	18	—	..
100	No. 2¼ color.....	..	—	16

MOTOR OILS

(Viscosity at 100.)

600	No. 7 color.....	30	—	32
500	No. 7 color.....	28	—	29
400	No. 6½ color.....	26	—	27

GASOLINE

GASOLINE TANK WAGON PRICES

	Net Tank Wagon.	Road Tax.	Total Tank Wagon.	Service Station.
Greater N. Y. C.	14	2	16	18
Syracuse	16	2	18	20
Rochester	14	2	16	18
Buffalo	14	2	16	18
Albany	16	2	18	20
Burlington, V ...	16	4	20	22
Manchester, N. H.	16	4	20	22
Augusta, Me	16	4	20	22
Boston, Mass ...	16	2	18	20

PENNSYLVANIA

	Net Tank Wagon.	Tot Service Station.
Pittsburgh	15	21
Philadelphia	15	21
Allentown	15	21
Erie	15	19
Scranton	15	21

Gasoline Prices in Other Markets

	Net Tank Wagon.	Road Tax.	Total Tank Wagon.	Service Station.
Atlantic City ...	14.5	2	16.5	18.5
Newark	13.5	2	15.5	17.5
Annapolis	14.0	4	18.0	20.0
Baltimore	13.2	4	17.2	19.2
Cumberland	15.0	4	19.0	21.0
Washington	13.7	2	15.7	17.7
Danville	14.8	5	19.8	21.8
Norfolk	13.3	5	18.3	20.3
Petersburg	14.3	5	19.3	21.3
Richmond	13.7	5	18.7	20.7
Roanoke	15.0	5	20.0	22.0
Charleston	14.5	4	18.5	20.5
Keyser	15.1	4	19.1	21.1
Parkersburg	13.2	4	17.2	19.2
Wheeling	14.4	4	18.4	20.4
Charlotte	15.3	5	20.3	22.3
Hickory	15.8	5	20.8	22.8
Mt. Airy	15.5	5	20.5	22.5
Salisbury	15.7	5	20.7	22.7
Charleston	13.3	6	19.3	21.3
Columbia	15.2	6	21.2	23.2

Two cents a gallon discount off gasoline tank wagon price to dealers and commercial buyers.

Automotive Stock Statistics

PASSENGER CAR COMPANIES

	Shares Authorized	Shares Outstanding	Par Value	Dividend	1929 Earnings Per Share	Full 1928 Earnings Per Share
Auburn	500,000	166,329	None	†4.00	21.23	10.77
Chrysler	6,000,000	4,452,615	None	3.00	* 5.55	6.79
Durant	3,000,000	1,852,419	None	None	...	...
Franklin	600,000	299,375	None	2.00	‡ 3.98	2.66
Gardner	300,000	300,000	5.00	None	...	...
General Motors..	75,000,000	43,500,000	10.00	†3.00	* 4.96	6.14
Graham-Paige ..	2,500,000	1,726,541	None	None	* .65	.41
Hudson	2,000,000	1,596,660	None	5.00	* 8.42	3.43
Hupp	2,000,000	1,440,317	10.00	†2.00	* 2.25	6.12
Jordan	500,000	450,000	None	None	* .29	...
Marmon	400,000	260,000	None	4.00	¶ 2.59	6.01
Moon	400,000	400,000	None	None	...	...
Nash	2,730,000	2,730,000	None	6.00	6.06	7.63
Packard	25,000,000	15,000,000	None	1.00	** 1.68	**1.45
Peerless	400,000	258,589	50.00	None	...	...
Pierce-Arrow A..	197,250	197,250	None	None	* 3.72	...
Reo	2,000,000	2,000,000	10.00	† .80	* 1.05	2.54
Studebaker	2,500,000	1,960,178	None	5.00	* 6.72	7.16
Stutz	400,000	400,000	None	None	...	...
Willys-Overland .	3,000,000	3,000,000	5.00	†1.20	* 1.35	2.09

MOTOR TRUCK COMPANIES

Brockway	500,000	219,081	None	3.00	†† 2.41	4.53
Federal	500,000	499,543	None	.80	†† .63	1.13
Mack	1,000,000	755,625	None	6.00	* 7.85	7.83
White	1,000,000	600,000	50.00	2.00	†† 1.75	2.45
Yellow	1,300,000	1,300,000	None	None	* .05	Nu

ACCESSORY AND EQUIPMENT COMPANIES

American Bosch.	250,000	207,399	None	None	* 4.47	5.02
Bendix Aviation.	3,000,000	2,115,000	None	2.00	* 3.26	4.44
Bohn Al. & Br. ..	375,000	352,198	None	†3.00	* 7.03	9.09
Borg-Warner ...	1,500,000	1,230,965	10.00	4.00	* 5.05	5.98
Briggs Mfg.	2,025,000	2,003,225	None	None	* 1.65	2.15
E. G. Budd Mfg.	1,101,000	1,031,352	None	†1.00	‡ 1.16	1.27
Budd Wheel	1,000,000	902,060	None	1.00	* 1.76	.16
Chicago Pneu. ...	500,000	199,469	None	None	* 2.38	6.76
Clark Equipment	250,000	250,000	None	3.00	* 4.84	4.92
Con. Motors	3,000,000	2,113,014	None	.80	b .33	b1.02
Eaton Axle & Spr.	300,000	300,000	None	3.00	* 4.41	5.29
Elec. Auto-Lite..	1,000,000	930,363	None	6.00	*10.61	8.60
Gabriel Snubber.	200,000	200,000	None	None	* Nil	1.64
Hayes Body	500,000	312,120	None	s8%	* *27	3.36
Houd'le-He'shey B	1,000,000	522,977	None	2.00	* 4.86	6.89
Kelsey-Haye: ...	1,000,000	749,454	None	2.00	†† 2.45	2.54
Link Belt	740,350	709,028	None	2.60	* 3.15	4.21
Marlin-Rockwell..	400,000	364,145	None	†2.00	* 5.87	6.93
Moto Meter G & E	750,000	512,500	None	None	a .28	...
Motor Products..	500,000	197,366	None	†3.00	*11.15	19.10
Motor Wheel....	1,000,000	825,000	None	†2.00	* 4.01	4.24
Mullins Mfg.	150,000	100,000	None	None	* 3.17	6.53
Murray Corp. ..	1,000,000	758,928	None	†3.00	†† 3.02	3.34
Reynolds Spring.	1,000,000	724,830	None	None	*.37	Nil
Spicer Mfg.	600,000	357,750	None	None	* 5.96	6.46
Stewart-Warner..	2,000,000	1,273,368	10.00	†3.50	* 5.15	6.46
Timken-Detroit .	3,000,000	992,096	10.00	† .60	†† .76	1.85
Timken Roller B.	2,500,000	2,401,764	None	3.00	* 5.06	6.08
Trico Products...	274,460	274,460	None	2.50	* 5.37	5.27
Wilcox-Rich B..	410,000	328,620	None	†2.00	* 3.65	*3.53

TIRE COMPANIES

Ajax	1,000,000	800,000	None	None	Nil	Nil
Firestone	3,500,000	2,500,000	10.00	1.60	b 3.27	b2.93
Fisk	2,000,000	1,704,392	None	None	Nil	Nil
Goodrich	1,500,000	953,638	None	4.00	†† 4.09	1.50
Goodyear	1,450,000	1,369,995	None	5.00	†† 7.02	5.04
Kelly-Sp'g'ld ...	1,200,000	1,063,840	None	None	Nil	Nil
Lee	300,000	300,000	None	None	1.61	.55
Miller	400,000	260,300	None	None	Nil	Nil
U. S. Rubber	2,000,000	1,464,371	None	None	†† .87	Nil

†And extras. *Nine months. **Year ended August 31. ‡First seven months. ¶Nine months ended November 30. ††Six months. aThird quarter only. bYear ended October 31. sStock.